THE

Practical Teacher

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'*Knowledge is proud that he has learned so much,*
Wisdom is humble that he knows no more.'—COWPER.

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Health at School.

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VI.—VENTILATION—*continued.*

IT being a part of the necessity of school life that children should be brought into close proximity with each other, and as close packing rapidly deteriorates the atmosphere in which they live, there is a natural tendency in their assembling together to poison each other. It follows that some means must be taken to obviate this tendency, and to prevent a serious evil. We have not far to look for those means, because it will always be found in nature that the allwise Author of our existence has placed the antidote not very far from the bane itself. The very circumstances which give rise to atmospheric deterioration at the same time set up conditions which provide a remedy if those conditions can have full play. There are natural laws which provide for the renewal of air in a given place if those natural laws are not impeded by some contrivance of man's invention. The first result of overcrowding is to raise the temperature of the room in which the crowd is assembled. The natural heat of the body is about 98·5; and when a number of persons are in close proximity to each other, even in the open air, their heat is imparted to the air in contact with their persons; and if they are in a closed room it is rapidly raised to a figure which, if other natural laws did not impede it, would raise the temperature of the room to 98·5, making it equal to that of the blood itself. But this tendency to equality is counteracted by the law which regulates the diffusion of gases and the tendency which exists between the air in the room and the air outside to equalize itself in consequence of that natural repulsion which exists between particles of a gas which are of the same nature. There are also other attributes of matter provided by nature to prevent the annihilation of the human species which would certainly result from the very attribute of things if some such provision was not made. One of the first results of a rise of temperature in a given room is the establishment of draughts. Whenever the air of a room has its temperature made higher than the outside air, by any cause whatever, there is an increase in the size of the molecules of the air itself which expels some of the warmed air from the room, the same condition is established by the air, as happens to water or iron under the influence of heat; each molecule expands and occupies more space than it did before. There is a tendency for the air in the room to diminish in material quantity by expansion in every direction. This causes a passage of air to take place from within outwards, and there is a commencement of the removal of the now adulterated air; but if air does get out, it follows, as a natural consequence, that air can also get in; and as the air outside is now colder than the air in the room, the cold air coming into contact with the warmer molecules causes them at once to contract their size and a vacuum is produced; more cold air gets in, and a draught is set up. This cold air has an increased impetus, and the colder it is the more certainly will it penetrate into the room with greater or less rapidity; the new intruders become warmed, and, expanding, press against those which resist their enlargement less decidedly, and which is in the direction of the warmer air; thus hot air goes out in one place and cold air enters by another, a more or less thorough draught is established. This is a part of the principle by means of which winds arise, and the air renewed on the surface of the earth. I stated that the problem was how to prevent the quantity of Co_2 in a given confined place from rising from the ordinary standard of ·4 parts in 1000 to some figure not much above that quantity. Nature gives us at once a means whereby this problem may be solved, viz.:—by admitting sufficient fresh air to keep the standard at its proper level; but this at once involves another problem which must be solved also if the principle of ventilation is to be a satisfactory one. A man upon an average inhales 16·6 cubic feet of air per hour, and produces about 12 to 16 cubic feet of carbon anhydride in 24 hours. To keep down the level of impurity to its allowed quantity involves the requirement of 100 times the volume of air for the purpose. It follows that more than 16·6 cubic feet per hour must be supplied for each individual for this object to be attained, and hence the tendency to excessive draught. How is this draught to be obviated? This is the second problem.

We must also bear in mind that there are many other sources of Co_2 in the atmosphere of a room than the human beings which it may contain. There is the great consumption of oxygen, and the rapid formation

of Co_2 in all cases in which lighting and heating are carried on. Combustion may cause even a greater deteriorate than that which is produced by human beings, although from causes presently to be mentioned, it is not always so dangerous in its results. Besides fires and lights, there are numerous kinds of animals, whose function it is to rapidly destroy the vital properties of oxygen; and there are also the thousand and one changes which are always going on in organic matter, by means of which still further quantities of oxygen are removed from the air, and to some extent returned as Co_2, in the oxidising changes which are always taking place around us. These sources of vitiation must be counteracted. There is therefore an absolute necessity for the introduction of great quantities of air to remove the carbon anhydride as rapidly as it is formed. Dr. Parkes calculates that 2,800 cubic feet of fresh air per hour are really regained for each individual, and under certain circumstances, such as sickness or during the time when a low state of health is present, this quantity ought to be much increased. Take a room, therefore, which contains fifty persons. It is necessary to make provision for the introduction of nearly 150,000 cubic feet of air per hour, to prevent contamination rising to too high a level. This introduction must also be equally diffused throughout the room, and not pass out again without conveying its proper quantity of Co_2 away with it. It will not do to imitate the action which is seen in the Lake of Geneva, where the muddy waters of the Rhone pass right through without defiling the waters of the lake. Let the picture be reversed, and let the river be pure water and the lake muddy, and you have no advantage from the current. Such is too often the result of the ventilation which is carried out now-a-days; although fortunately for humanity, there are qualities in air which do not so immediately belong to water. I mean the quality which resides in the law of diffusion of gases, and by means of which the molecules of a gas have a tendency to repel each other and to diffuse themselves into space whenever the opportunity allows them to do so. It is this law of diffusion which leads gases of different densities, and with different attributes, to rapidly diffuse themselves even in opposition to the law of gravity. Co_2 is a very heavy gas, and has a natural tendency to remain at the bottom of a room, because of its greater density as compared with common air; but that great preserving power which the law of diffusion provides leads to the rapid dispersion throughout the air of any quantities of Co_2 which may be discharged into space. Hence it happens that out of doors there is no great difference in the quantity of Co_2 at the top of a house as compared with the bottom, and the most thickly inhabited parts of a great city do not show out of doors any very serious diminution in the quantity of O, or of increase in the quantity of Co_2, a few parts in a million being the outside of this deterioration. The law of diffusion must therefore be a powerful means whereby the purity of the atmosphere is retained, provided the law has fair play. But it will be said, if it is necessary to admit 150,000 cubic feet per hour into a room which contains fifty persons, how can this be done without a draught being sent up? Here are the two problems —remove impurity and prevent draught. You have to take care that in the first place, the temperature outside shall not be capable of interfering very much with your arrangements. If the season is temperate provision must be made to so rapidly admit fresh air that there shall not be so great a difference between the inside of the room and the outside so as to set up currents in spite of the arrangements provided. If the temperature outside is cold, means must be provided for warming that cold air before it is admitted, and so prevent injury from that source. It will be seen from these observations, that a system of ventilation requires a series of entrances and exits which shall balance each other, and be capable of being regulated to meet the changes which arise from a rapid rise or fall of temperature, or from the increased or diminished number of human beings, or increased or decreased amount of chemical change which combustion or other oxidising causes may set up in a given room.

These observations will point out at once to the intelligent reader that there is no principle of ventilation which can be provided which, without adaption, will suit all conditions under which a school-house, or any other assembly for people may be placed. Those patents which are so often vaunted as perfect ventilators, and which are invariably without adjustment, are necessarily faulty; they may suit one set of conditions, but they cannot possibly do for another.

It is evident that if 150,000 cubic feet are required for fifty persons, it will not be necessary to admit that quantity into that room if there are only five; for this reason, the rapid introduction and removal of air tends to chill the persons exposed to that rapid removal by carrying away some of their natural heat as well as the impurity which they produce; hence an intelligent regulation is necessary to be observed, and it is required that in every school there should always be an individual who knows something of the requirements of ventilation, who shall be appointed to regulate the inlets and outlets, to consult the thermometer, both in the room and outside, and under certain circumstances also understand the theory of the dew point for reasons to be mentioned.

Respiration renders the expired air impure by the addition of other things besides Co_2: a variable quantity of organic matter is discharged from the lungs, and also by transpiration from the skin, which amounts in an adult to from 30 to 40 grains in the 24 hours; children give out much larger quantities, weight for weight, than adults do. This organic matter consists of particles of skin, fatty particles, and if there are diseased people in the room, particles of pus or matter, germs of fungi and other microphytes, and some volatile material, which is early discovered by the fetid smell which it produces in any room which is closely packed and imperfectly ventilated. The air of a dormitory just before sunrise, in which there are too many children and too little fresh air admitted, is sometimes very overpowering, as doctors too often find out, when, in cases of sudden illnes they have to pass from the pure air out of doors into the impure air of the bedroom. This organic matter when collected, by passing the air of such a room through water, which liquid easily retains it, very soon goes into putrefactive fermentation and gives rise to an excessively offensive product. Besides this organic matter, there is also a considerable quantity of aqueous vapour. If we take a glass of cold water suddenly into a crowded room, the outside of the glass will be immediately covered by a deposit of dew-like particles, and on a cold night the windows of a room which is crowded will be observed to be running down with water which has been condensed from the air inside

the room by simple contact with the cold glass. This condensed vapour collects on walls, ceilings, glass, furniture, etc., making them feel damp and clammy, and setting up that peculiar and offensive odour which is the attribute of all ill-ventilated and over-crowded dwellings. To live in an atmosphere or this kind is to condemn those who have to do it to a low state of health, to produce a strong tendency to the production of certain diseases. It enables the germs of infectious diseases to spread with great rapidity, and, even more serious still, it gives rise to the possibility of tubercular diathesis being set up in a whole district. If there happens to be in such a place a person who is suffering from disintegrating tubercle, that which is called rapid consumption, or persons having discharges of a so-called scrofulous kind, the breath disperses particles of organic molecular matter throughout the room. If it is inhaled by another, that other himself in a condition which allows the impure particle to find a nidus upon which it can increase and multiply, there is set up in that person a focus from which it too often happens that so-called consumption is established, and permanent ill-health produced. I firmly believe that persons in good health, and who are accustomed to live in pure air, are not likely to become consumptive from this cause, and they may feel certain that to them consumption is not infective. Before particles of infective tubercular matter can take root in a given body and grow, it is necessary for that body to be the possessor of debased material which has not been properly excreted. If that debased material is not present, the germs of infectious matter which has been accidentally inhaled are perfectly harmless—they can no more germinate than the grains of barley which are sometimes found in the tombs of the Egyptian kings. Air, moisture, etc., are necessary for the germination of seeds; so impure and rapidly changing organic matter, such as that which is washed out of the air of a close room and which has not been removed or oxidised, is the material in which the germs of infective tubercular matter can, and do, grow to the detriment of a whole district when a schoolmaster is afraid of fresh air, and keeps his pupils in an impure atmosphere.

The size of the room is not so important an element in the case as is the capacity for the entrance of pure air; and although the size of the room has an important bearing, and its cubical contents may be taken into consideration, it is not so important as the entrances and exits provided for the admission and discharge of air, and the floor space allowed to each child. The cubical contents may be much modified by the height of the walls: a room a yard square and fifty feet high would be no better for a child to live in than one a yard square and ten feet high. That illustration will serve to show the uncertainty which may belong to a consideration of numbers which are based upon the cubical contents of a given room.

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Practical Lessons on Insect Life.

BY THEODORE WOOD, M.E.S.,
Joint Author of 'The Field Naturalist's Handbook.'

No. V.—THE COLEOPTERA, OR BEETLES.

PART II.

THE *Brachelytra*, or *Staphylinidæ*, popularly known as the Cocktail, or Rove Beetles, form the next of the principal divisions of the Coleoptera.

Their chief distinguishing characteristic is found in the elytra, which are wonderfully small, seldom covering more than two segments of the abdomen, the remainder of which is left free. In some cases, even, the elytra are shorter than the thorax.

In spite of the small size of the elytra, however, the wings are very large, and are folded and packed away beneath their cases in the most wonderful manner. This operation is chiefly performed by the tip of the abdomen, which is bent over the back for that purpose; hence, the name of Cocktails.

Most of the *Brachelytra* are long, narrow insects—some, in fact, being almost thread-like. They may be found in all sorts of decaying animal and vegetable matter, carrion, manure-heaps, cattle-droppings, etc., always containing them in great numbers. To the labours of these beetles, and some others, in fact, we are indebted for the prevention of numberless fevers and agues, for no sooner does garbage of any kind show signs of decomposition than it is attacked by the insects, and before long completely devoured.

In size, these insects vary very greatly. The well-known Devil's Coach-Horse (*Ocypus olens*), for example, attains the length of an inch and a quarter, while some of the smaller British species are of microscopical dimensions, never exceeding one forty-eighth of an inch in length.

This Coach-horse beetle is common enough almost everywhere, hiding under stones, rubbish-heaps, etc., by day, and sallying forth at night in search of prey. Its dull black colour, and threatening aspect, give it a most repulsive appearance, and few except entomologists would care to meddle with so unpleasant-looking an insect.

In reality, it can do very little harm, although its jaws are able to inflict a rather powerful nip. It possesses, however, the power of exuding a fluid of the most unpleasant and penetrating odour, which hangs about the fingers for days, and cannot be removed without considerable trouble. Most of the rove beetles make use of this unpleasant mode of defence, the fluid being secreted in two glands at the extreme tip of the abdomen.

The *Ocypus* is remarkable for the size of its eggs, which are of wonderful size in comparison with the dimensions of the insect, being no less than one-tenth of an inch in length. The larvæ are not unlike the parent insect, with the exception of the absence of wings.

A closely allied species, *Leistotrophus nebulosus*, is perhaps one of the most fierce and courageous of the group. Although considerably less in size than the *Ocypus*, it can do infinitely more damage, and if carelessly held will cause its jaws to meet in the flesh of the captor. This insect is rather a handsome one, being brown, mottled with grey and black.

Some of the smaller *Staphylinidæ* are only too well known as possessing a remarkable talent of flying into the eye, where they cause considerable irritation before they can be ejected. The little black 'flies,' which are so troublesome on summer evenings, are almost always *Brachelytra*, as can be seen by waving a sheet of gummed paper in the air, when the beetles will adhere to it.

NEXT in order we have the *Clavicornes*. These, as before mentioned, may be known by the structure of the antennæ, which are expanded at the tips into a kind of club.

The beetles of this group are far more variable in

size and form than are the *Brachelytra*. Some of them strongly resemble the insects of the latter group, the elytra being very short, and leaving the greater part of the abdomen unprotected. Many of these insects, all small species, are found in the nests of various ants, in company with some of the *Staphylinidæ*, where they are as jealously protected by the insects as are their own larvæ and pupæ, being carefully tended, and carried away into the interior of the nest at the slightest sign of danger. The object of their presence is not yet known.

Perhaps the most interesting beetles of this group are those popularly known as Burying, or Carrion Beetles, and scientifically as *Necrophori*.

Several species of these beetles inhabit this country, and are tolerably common, although seldom seen except by those who know how to look for them.

As their popular title infers, these beetles are chiefly to be found in carrion, and may be obtained in plenty from the carcase of any dead animal which is found lying in the fields. But their habits are very different from those of the *Staphylinidæ* and other beetles which are found in their company.

As soon as they detect the odour of decaying flesh, the burying beetles wing their way to the spot, not so much for the purpose of finding food for themselves as for providing it for their future offspring.

Now, if the eggs were deposited in the carcase as it lay upon the ground, decomposition would be complete in a few days, and the newly-hatched grubs would thus be left without food. In order to obviate this, the carcase is completely buried by the beetles, which shovel away the earth from beneath it by means of their broad and powerful heads. After digging for some little time, throwing out the earth as they proceed, they emerge from beneath the body, and rest for an hour or so. What follows can best be told in the words of the late Mr. E. Newman, in his famous 'Letters of Rusticus.'

'The male beetle then dives again into the grave, and pulls the bird down by the feathers for half an hour. Its own weight appears to sink it but very little. The earth then begins heaving and rising all round, as though under the influence of a little earthquake; the feathers of the bird are again pulled, and again the bird descends. At last, after two or three hours more labour, the beetle comes up, again gets on the bird, and again takes its survey, and then drops down as though dead, or fallen suddenly fast asleep. When sufficiently rested, he rouses himself, treads the bird firmly into its grave, pulls it by the feathers this way and that way, and having settled it to his mind, begins to shovel in the earth. This is done in a very short time, by means of his broad head. He goes behind the rampart of earth, and pushes it into the grave with amazing strength and dexterity, the head being bent directly downwards at first, and then the nose elevated with a kind of jerk, which sends the earth forwards. After the grave is thus filled up, the earth is trodden in, and undergoes a keen scrutiny, all the bird being completely hidden; the beetle then makes a hole in the still loose earth, and having buried the bird and his own bride, next buries himself. The female lays her eggs in the carcase of the bird, in number proportioned to its size; and after this operation is over, and the pair have eaten as much of the savoury viand as they please, they make their way out, and fly away in quest of further adventures.'

It will thus be seen that the carcase, being buried in the ground, is preserved in the best condition for the food of the future larvæ, for the moisture of the earth prevents it from drying up, while it is protected from the sun and rain which would cause it to decompose with undue rapidity.

Burying Beetles and dead Mouse.

The burying beetles are handsome insects, the ground colour being black, with two broad bands of orange crossing the elytra; one very common species, however, is altogether black. In the accompanying illustration some of these beetles will be seen engaged in interring a dead mouse.

The burying beetles are usually assisted in their task by some of the various Histers and *Silphidæ*, of both of which there are many species. The former are rather small, highly-polished insects, which feign death on being touched, rolling up the legs beneath the body, and remaining perfectly still until they imagine the danger to be past. They are chiefly black in colour, although some of the species are spotted with red. The Silphas are flat beetles, with the head almost entirely hidden away beneath the thorax. These latter insects are also common in old bones, and also in the carcases of 'vermin' suspended on the 'keepers' trees' in coverts.

To the *Clavicornes* also belong the *Trichopterygidæ*—beetles so small that a powerful microscope is necessary in order to distinguish them from one another. These tiny insects are common in rubbish heaps, looking like living black specks as they move about.

Another interesting family in this group is that of the *Dermestidæ*, the commonest species of which, *Dermestes lardarius*, is popularly known as the Bacon Beetle.

These insects, like the burying beetles, are carrion feeders, and are abundant in the carcases hung upon the 'keepers' trees' before-mentioned, preferring, however, the dried skins to the decaying flesh. In museums they are terribly destructive, detecting any skin which has not been properly prepared, and reducing it to fragments in a very short space of time.

The Pill Beetles *(Byrrhidæ)* also belong to this group. The beetles of this family possess a wonderful faculty of simulating death when alarmed, the legs and antennæ fitting closely into grooves upon the under surface of the body, and the creature resembling a small dusty stone far more than an insect.

While thus feigning death, the pill beetles will allow themselves to be picked up and handled without

evincing the slightest sign that they are living objects, and not until the danger may be supposed to have finally disappeared do they unroll their limbs and continue their journey.

Some of the Clavicornes are inhabitants of the water although in a different way to either the true water-beetles, or the *Hydrophilidæ*. They do not swim actively through the water in pursuit of prey like the former, or spend their existence in crawling upon the aquatic weeds, etc., as do the latter, but are chiefly found clinging to the under surfaces of stones lying in the beds of swiftly running streams.

NEXT we come to the Lamellicorns, or 'leaf-horned' beetles. These derive their title from the structure of the antennæ, the club of which is composed of three or more plates attached to each other at one end, and usually movable like the rays of a fan. These beetles are popularly known as Chafers.

The most abundant and best known of these is the common Cockchafer *(Melolontha vulgaris)*, which is so terribly destructive to the farmer and agriculturist.

Cockchafer.

The egg of this insect is laid beneath the ground, and the grub, which shortly emerges, feeds upon the roots of the grass and other crops, often doing incalculable damage. In some places, even, the turf may be rolled up by the hands, the roots of the grass having been completely destroyed by the grubs.

Larva of Cockchafer.

The perfect insect is fully as destructive, feeding upon the foliage of trees, and sometimes entirely stripping them of their leaves. The larva and pupa, as well as the perfect insect, are shown in the accompanying illustrations.

Pupa of Cockchafer.

The well-known Dor, or Watchman Beetles *(Geotrupes)*, are also included in this group. These form the direct opposite of the preceding beetle, being absolutely beneficial to mankind by removing the dung of animals beneath the ground in somewhat the same manner as carrion is buried by the *Necrophori*.

The dor beetle, when about to deposit her eggs, selects a patch of cow-dung, and burrowing her way into it, digs a tunnel some ten or twelve inches in depth into the earth beneath, by means of her powerful front legs and head. Ascending again to the surface, she carries down a portion of the dung to the bottom of her tunnel, deposits an egg in the midst, and sets to work at a second tunnel, and so on until she has laid the whole of her eggs. The grubs, when hatched, feed upon the food thus stored up for them until they are able to ascend to the surface of the ground and cater for themselves.

Some of these dung-loving beetles are constructed in a manner which strongly reminds one of the curious forms found in the tropics. Especially is this the case with the insect scientifically known as *Typhæus vulgaris*, but possessing no popular name. In this species the thorax is developed into three horns, or teeth, two of which project on either side, enclosing the head between them, while the third slants obliquely upwards midway between them. The male, only, possesses these singular appendages, which, in the female, are merely represented by small pointed knobs.

The strength of all these burrowing insects is very great, that of the fore-limbs, upon which falls all the burden of the work, being especially remarkable. This can be easily proved by attempting to confine one of these insects in the closed hand, when the strength of the digging legs will be found as much disproportioned to the size of their owner, as that of Hercules would be in the arms of an ordinary human being.

Yet, when we consider the work done by these insects, we marvel, not at the power of their limbs, but at the fact that creatures so tiny, strong though they may be, should be able to perform such feats. For an ordinary dor-beetle to burrow some twelve inches into the ground is much the same as if a man of ordinary stature were to dig, aided by no other tools than those with which nature has provided him, a tunnel of seventy-two feet in depth, and exceeding in diameter the size of his body.

These beetles are most abundant in the spring and autumn, when they may be seen circling about at dusk, searching for a favourable spot in which to deposit the eggs.

The well-known Stag Beetle *(Lucanus cervus)* is also a member of this group. This is a very unequally

distributed insect, in many places being exceedingly common, while in others it is never seen.

There is a considerable difference between the sexes, the male being a much larger insect than his mate, and possessing long and toothed jaws, those of the female being short and sickle-shaped. It is not the case, however, as might be thought, that the bite of the male is the more severe, for his jaws can do little or no damage, while the sharp mandibles of the female can inflict a tolerably severe bite, sometimes even meeting in the flesh.

The jaws of the stag beetle, and more particularly of the female, are capable of considerable exertions. I remember a case in which a female specimen of this insect, one of my own capture, was placed inside a strong willow-chip box and forgotten. Some days afterwards, upon looking at the box, the beetle was found to have worked her way partly through the side, having gnawed a hole large enough for her head and her fore-legs to pass through. When once in this position, however, she was unable to move either backwards or forwards, and, had she not been released, must have remained fixed until death set her free.

The stag beetle is one of the wood-feeding insects, the larva dwelling in the trunks of trees. Remaining, as it does, in this state for several years, during the whole of which time it is burrowing in the wood, it can be easily imagined that it causes no little havoc, and if a tree is attacked by several of these larvæ its doom is sealed.

When full-fed, the larva leaves the wood and burrows into the earth, where it constructs for itself a strong cocoon in which to undergo its change to the pupal condition. The perfect insect appears in reality about the middle of winter, although it is seldom seen at large until June; for pupæ, opened in January, have been found to contain fully-developed insects. This is also the case with many other beetles, which, undergoing their final change during the winter, do not make their appearance in the world until considerably later in the year.

The size of the stag beetle is exceedingly variable, a well-developed male sometimes attaining the length of three inches, while other specimens are barely one-half of that size.

(*To be continued.*)

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Anecdotal Natural History.

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No. VII.—THE CAT TRIBE.

PART III.—THE JAGUAR, PUMA, ETC.

THE Ounce (*Leopardus uncia*) of Asia resembles the Leopard so closely, both in appearance and habits, that a detailed description is unnecessary. It may be distinguished from either of the preceding animals by the woolly aspect of its fur.

We therefore pass it by and come to the Jaguar (*Leopardus onca*) of the American continent. In its native country the animal is usually spoken of as the Tiger, just as the bison is erroneously dubbed the buffalo.

The jaguar is by no means unlike the leopard in form and markings, but may be easily distinguished by one or two peculiarities.

In the first place, two or three bold black stripes are drawn longitudinally across the breast, these being never found in the leopard. The spots, too, with which the body is thickly covered, are more angular in shape than is the case in that animal, and are formed like rosettes, each containing either one or two smaller spots in its centre. Along the spine, from the neck to the first foot or so of the tail, runs a chain of solid black spots and dashes. The tail, too, is much shorter in proportion to the size of the animal, and barely touches the ground when its owner is standing erect.

The ground colour of the jaguar's fur is a bright tawny brown, in some specimens being much more brilliant than in others. A black variety is occasionally met with, just as is the case in the leopard, the whole fur assuming the dusky hue of the spots, which are very indistinct, and only to be distinguished in certain lights.

Like the tiger, the jaguar is of an extremely cautious nature, and seldom ventures upon an open attack, unless his enemy be very much inferior in size and strength to himself. Should he meet with a herd of animals, or a party of travellers, he will dog their steps for miles, hoping to surprise an individual when separated by a short distance from his comrades.

As regards his food, the jaguar is extremely impartial, and preys alike upon all branches of the animal kingdom. His favourite diet is, perhaps, the flesh of the various monkeys which inhabit the American forests, the attainment of which delicacy, however, is attended with considerable difficulty.

For, though the jaguar is an adept in the art of tree-climbing, and can make his way among the branches with considerable ease and facility, the monkeys are even greater proficients, and, by the quickness and agility of their movements, would soon distance their pursuer if he resorted to open chase. His usual method of obtaining his favourite food, therefore, is by leaping upon the unsuspecting animals from some place of concealment, or by surprising them when asleep. In such a case a few strokes of his powerful paw dash several of the animals to the ground, where their assailant can devour them at his leisure.

Another favourite delicacy is the flesh of the peccary, the procuring of which is fraught with equal difficulty and far more danger than is the case with the monkeys.

For the peccary is distinguished by the possession of a fierce, unreasoning courage, causing it to dash at the most formidable foe, and wreak its vengeance with its terrible tusks, which cut like so many razors. In fact, if a jaguar were to be attacked by a herd of these little animals, he would have no chance against them, and could only save his life by resorting to a tree until their patience became exhausted, and they retired from the neighbourhood.

The capybara falls a frequent victim to the attacks of the jaguar, who even follows it into the water. Large animals, such as horses or deer, it kills in the same manner as does the leopard, namely, by leaping upon them from the overhanging branches of some tree, and breaking their necks by a powerful wrench with the fore-paws. Even animals of considerable size are carried off without difficulty by the jaguar, which has even been known to attack two horses which were tethered together, kill one, and drag both animals to its lair, in spite of the struggles of the survivor.

Of birds, also, the jaguar is fond, and strikes them down with a blow of his paw. Even should his intended prey take to flight, he is often able, by one of his wonderful bounds, to capture it before it has passed beyond his reach. Fish he captures by lying in wait upon the banks of a stream, and hooking them out with his paw as they pass beneath him. Turtles, too, often fall a prey to him, and are killed and eaten in a very ingenious manner.

Watching for the female turtles as they make for the sea after laying their eggs in the sand, the jaguar springs upon them, and quickly turns them upon their backs, a position in which they are perfectly helpless. He then breaks away the softer parts of the shell by the tail, and, inserting his paw, scoops out the whole of the flesh through the aperture thus made. Of the eggs, too, he is very fond, digging them up from the sand in which they were deposited. Lizards, shellfish, and even insects also fall victims to his voracious appetite.

In farmyards the jaguar is a terrible enemy, doing the utmost damage among stock of all kinds. Some of the earlier settlers, in fact, were so troubled by these animals that they found it perfectly impossible to keep any live-stock whatever until the jaguars were finally driven from the neighbourhood. And this was no easy task, the craft and cunning of the animals rendering it a very difficult matter to kill or trap them.

The hunting-dogs of the country show a wonderful aptitude for tracking the jaguar, as is well described by the late Mr. C. B. Brown, in his *Camp and Canoe Life in British Guiana*, as follows:—

'Many of the Indian hunting-dogs, trained for deer or tapir, will hunt tigers (*i.e.*, jaguars). When on the track of either of those animals, should they come across the scent of a tiger, their eager and confident manner of pressing on after the game is immediately changed, and, with the hair on their backs erect, they become cautious and nervous to a degree, jumping at even the snapping of a twig. Abandoning the hunt, they take up the tiger's track, and follow it. But should the huntsman call them from it, or not cheer them on with his voice from time to time, they exhibit great fear, and, keeping close to his heels, cannot be induced to hunt any more in that district for that day.

'On the contrary, if allowed to follow the tiger, they track it up with caution, being fully aware of the cunning dodge practised by that animal; which is, when the dog is close at hand, to spring to one side and lie in ambush until it passes, when with one spring the dog is seized.

'Ordinary dogs would fall a prey to this trap, but not the self-taught tiger-dogs. Their fine powers of scent warn them of their near approach to the quarry, when they advance with great caution, never failing to detect the tiger in time, and when once their eye is upon their enemy it has no chance of escape.

'In its pride of strength the jaguar scorns the dogs, and, with a rush like a ball from a cannon, springs at one of them, feeling sure that it cannot escape.

'It has reckoned, however, without its host, for the dog eludes the spring with ease, and with great quickness flies on the tiger's flank, giving it a severe nip. As the tiger turns with a growl of pain and disappointment, the dog is off to a little distance, yelping lustily, and never remaining still an instant, but darting first on one side and then on the other. After one or two ineffectual charges the tiger gives it up, and on the approach of the hunter springs into the nearest suitable tree, which it seldom leaves alive.'

The jaguar is very tenacious of life, and even when mortally wounded will often travel to a considerable distance before it succumbs to its hurt.

This animal seems more easily tamed than most of the larger members of the Cat tribe, and becomes thoroughly domesticated, following its master like a dog, and allowing all manner of liberties to be taken with it without resenting them.

The Puma *(Leopardus concolor)* is the next of importance among the members of the Cat tribe. This animal is known under a bewildering variety of names, among which may be mentioned the American Lion, the Panther (or 'Painter'), Cougar, and the Gouazouara. Sometimes, too, it is erroneously termed the Carcajou, which is one of the deer tribe, and the Kinkajou, a remarkable animal belonging to the ursine group.

The title of American Lion evidently refers to the colour of its fur, which is of an uniform tawny hue like that of the animal after which it is named. The tip of the tail is black also, but does not possess the tuft of hair which is a distinguishing characteristic of the true lion.

The puma is by no means so large an animal as any of the preceding, seldom exceeding six feet and a half in total length, of which almost one-third is occupied by the tail. The head is remarkably small, causing the animal to appear even less in size than is actually the case.

It is a rather curious fact that the cubs of the puma should be marked during their infancy with greyish-black stripes, just as are the young of the lion. Besides these, a number of darker spots are visible over the greater part of the body, both stripes and spots disappearing in the course of a few months.

The puma is another of the tree-climbing cats, and its limbs are wonderfully strong and powerful in order to fit it for its semi-arboreal life. Its habits, when in search of prey, strongly remind one of those of the jaguar, crouching, as it does, like that animal, among the branches of some convenient tree until an animal is unfortunate enough to pass beneath. While resting among the foliage it is remarkably inconspicuous, the body being flattened against a bough, and the dark-tawny fur harmonizing almost perfectly with the bark.

Although terribly destructive in farmyards and so on, as many as fifty sheep in one district alone having been known to fall victims to the animal in the course of a single night, the puma is not personally feared by the settlers and hunters. When meditating an attack it is even more cautious than the jaguar, often following its quarry for miles without daring to show itself. Even when it summons sufficient courage to follow up its attack, and arrives within springing distance of its intended victim, it cowers and shrinks away if a bold front be shown, appearing unable to withstand the gaze of the human eye.

The food of the puma is much the same as that of the jaguar, the peccary and the capybara being especial favourites with it.

The various species of Felidæ, called TIGER-CATS, include several pretty and graceful animals, such as the Ocelots, the Margay, the Rimau-Dahan, and the Chati.

The Ocelots are all inhabitants of tropical America, the most abundant species being that known as the Common Ocelot *(Leopardus pardalis)*. This animal is a singularly pretty one, some four feet in length, from the nose to the tip of the tail, and standing about eighteen inches in height at the shoulder. The ground colour is a delicate greyish fawn, marked with broken bands of darker fawn edged with black. Along the spine runs an unbroken black line. The ears are black, with the exception of a white spot upon the back.

In consequence of the handsome markings and delicate fur, the skins of these animals are much sought after.

Another species is the Grey Ocelot *(Leopardus griseus)*, which is of a lighter colour than the preceding animal, the spots, also, being less numerous and distinct. All the species are very quick and active in their movements, and in form and habits strongly resemble miniature leopards.

OUR own domestic cat, really a descendant from the Egyptian animal *(Felis maniculata)*, is generally supposed to have sprung from the Wild Cat *(Felis catus)*, which at one time was very abundant in this country. In the olden times, when hunting and warfare were almost the sole occupation of the upper classes, this animal was even preserved for the chase, just as is the fox at the present time, and severe penalties were enacted against those who should cause its destruction, except in the legitimate manner.

At the present day, the Wild Cat is almost extinct, as far as regards Great Britain, a few scattered specimens, only, existing in some of the Scottish mountain woods. There it causes considerable havoc amongst the game, just as our domestic cat will if it once imbibes a taste for poaching. In fact, there is hardly a more inveterate enemy to partridges and pheasants than a pet cat, which will visit the coverts night after night, and destroy the birds in numbers, often paying the penalty with her own life should the keeper happen to meet with her. Many tame cats, even, leave their homes, and take entirely to a wild life, living on the game which they capture. When trapped, these are often mistaken by the keepers for the genuine wild species. It is hardly possible to pass through a preserve without noticing the dead bodies of several cats, which have been shot by the gamekeepers, and hung up on the 'keepers' trees' in company with the carcases of weasels, stoats, etc., as a warning to other 'vermin.'

The differences between the wild and the domestic cats are very apparent. The markings of the former vary but very little, the ground colour being an uniform yellowish grey, while a number of dark streaks run round the body at right angles to the line of the body and limbs, reminding one rather strongly of the markings of the tiger. A chain of black spots runs down the spine as far as the tail, which is very much shorter and more bushy in proportion than that of the domestic species. The tip, for an inch or so, is invariably black, the rest being banded in the same way as the body. The ears, too, are much shorter than those of the tame animal, and the aspect of the creature is remarkably fierce and savage. Its character is not belied by its appearance, for its courage and ferocity are so great that even to an armed man it is no contemptible foe.

The Lynxes form a very conspicuous group. The Common Lynx *(Lyncus virgatus)* of Southern Europe is well known by name, its keenness of sight having passed into a proverb. It is spread over a considerable part of the mountainous parts of South Europe, and is also found in many of the forests of Northern Asia.

The Lynx is not a very large animal, being about three feet in total length, exclusive of the tail. The fur is of a dark-grey colour, varying slightly, according to the season of the year, with darker spots of various sizes. The tail is very short, sometimes being barely six inches in length. The ears are remarkable for the tuft of long hair which fringes the tips.

The Canadian Lynx, or Peeshoo *(Lyncus Canadensis)* is chiefly noticeable for its mode of running, which operation consists of a series of bounds, all four feet coming to the ground almost simultaneously. The fur, which is long and fine, is much sought after.

There is another species, the Booted Lynx *(Lyncus caligatus)* found both in Asia and Africa, which is so called from the deep black colour of the lower parts of the legs, causing them to appear as though enclosed in tightly-fitting boots. None of the Lynxes are particularly destructive, except to the small animals, such as hares, rabbits, etc., upon which they prey.

One of the most interesting of the Cat tribe, and the last which can be mentioned in this paper, is the well-known Chetah, or Hunting Leopard *(Gueparda jubata)*, sometimes termed the Youze.

The Chetah is found both in Asia and Africa, but in the former continent alone has been brought under the dominion of man. In size it is slightly superior to the leopard, its long limbs causing it to appear even larger than it is in reality. The markings are not unlike those of the leopard, to which animal, however, it is by no means closely related, appearing to form a connecting link between the feline and canine races. It is only slightly possessed of the power of climbing trees, and its limbs do not possess the strength of most of the cats.

Unlike most of its tribe, the Chetah captures its prey by open chase, and it is in this way that it is made useful to man, the animal being carefully trained for capturing game by many of the Asiatic races.

For this purpose, the animal is blindfolded, and taken out to the scene of operations in a light cart, where he is kept until a herd of deer or other game comes within sight. The hood is then removed, and the animal's attention directed towards the quarry. The Chetah immediately slips gently off the car, always doing so on the side which is away from the deer. Flattening his body on the ground, he creeps up to within a short distance of the unsuspecting animal, taking advantage of any bush or stone as a cover. He then launches himself upon the doomed animal, seldom needing more than two or three springs, fastens on its neck, and pulls it to the ground. The keepers immediately hurry to the spot, and take off his attention by offering some dainty, such as a ladleful of the blood. The slaughtered animal is then secured, and the Chetah is hooded and led back to the car, when he waits for another victim.

The Chetah is very easily tamed, being naturally of a very gentle and placid disposition. Even a newly-caught individual is easily managed, seldom or never exhibiting the savage nature of the lions and tigers, and other members of the Cat tribe.

(To be continued.)

Short Historical Anecdotes.

BY REV. SIR GEORGE W. COX, BART., M.A.

(30) Two Sieges of Constantinople, 1204; 1453.

Early in the thirteenth century Constantinople fell into the hands of the Crusaders, and the throne of the Eastern emperors was filled by a Latin sovereign, who hoped that he might bequeath it to a long line of successors. With those who supported him, he also hoped that the long schism which had rent Christendom asunder had been brought to an end by the triumph of the armies of the Cross. But the triumph was celebrated after a fashion which boded ill for the permanence of the new dynasty, or for the reconciliation and harmony of the Eastern and Western Churches. Crowds half mad with excitement and rage pressed into the church of Sancta Sophia, the mighty work of Justinian. A shameless woman, with disgusting gestures, screamed out a profane song from the chair of the patriarchs, while those who could fight their way to the altar drained off the wine in the vessels placed upon it. Mules and horses, driven into the churches to carry away the sacred treasures, were lashed if they fell, till their blood streamed on the pavement; while plunderers, who had a more careful eye to the future, were busy in stripping the reliquaries of the bones of saints to be carried to the great cities and churches of Western Europe.

Two centuries and a half later, Constantinople was again besieged, and again taken. After an obstinate defence of fifty-three days, the last Palæologus fell fighting bravely for his crown and his people. His only fear was that he might fall alive into the hands of the infidels, and he was heard to ask, 'Cannot a Christian be found to cut off my head?' None were ready to do him this service, and casting off the purple, he was presently buried beneath a mass of dead. The streets of the city again streamed with blood, and the populace poured once more into the great church of the Holy Wisdom (or St. Sophia). Every part of the vast building was filled with fugitives, who felt sure that there they would be safe, for they were assured by a prophecy which told them that the Turks would be smitten back when they reached the column of Constantine in the square before the church, and that the instrument of their discomfiture would be a sword brought down from heaven by an angel, who would place it in the hands of a poor man seated at the foot of the column. The hope was not to be realised, and the discords of centuries were now to be punished by worse than death for thousands who were saved for a life of shame. The Turks broke down the doors by the strokes of their axes: the crowds within the building were soon made prisoners and sorted for the market. Not less, probably, than sixty thousand were sold into slavery. The dome of Justinian, of which the people had delighted to speak as the second firmament and the throne of the glory of God, was stripped of its gold and silver, and a scene of riot was repeated, more hideous even than the orgies which followed the victory of the Crusaders under Baldwin and Dandolo. But in great and overwhelming calamities the popular mind can still take refuge in hope; and the temper which led Englishmen to believe that Harold had not fallen at Hastings, comforted the Greeks of Constantinople with the assurance that in four centuries the city and empire would be freed from the Turkish marauders, and the sanctuary cleansed from its pollutions. Hidden within its mighty walls the priest (so the legend runs) stands ready vested, to come forth when the hour arrives, and offer up the great Christian sacrifice once more upon its altar.

(31) The Funeral of Charles V. at Yuste, 1558.

Those who have read Washington Irving's delightful story of the *Rose of the Alhambra*, may fancy that the ceremony which the Emperor Charles V. went through shortly before his death was simply a freak such as that which Irving ascribes to the weak and foolish Philip V. Philip's great predecessor on the Spanish throne was never more thoroughly in his senses than when he gave orders for the celebration of his own funeral rites while he yet lived. Such ideas are perhaps not likely to arise without some suggesting cause; and the biographer of Charles's cloister life at Yuste points out that the Bishop of Liege, who was his ambassador to the Diet at the time of his election to the imperial throne, had been in the habit of following his coffin year by year in solemn procession to the tomb which he had built for himself in his cathedral-church. During his sojourn at Yuste, Charles had been specially careful to celebrate the obsequies of his friends, as they were removed by death from this earthly scene; and masses for the soul of his father, mother, and wife accompanied the daily masses offered for himself. He now ordered dirges to be said for them, and having so done, asked his confessor whether it would not be well for him, by celebrating his own funeral rites, to do for himself at once what would in any case soon be done for him by others. To the confessor's answer that he might yet live for years, and that at the proper time all that was necessary would be done without his troubling himself about the matter, Charles replied by asking simply, 'Would it not be for the good of my soul?' and being told that it would, gave orders for the carrying out of the ceremonial on the following day. The high altar blazed with lights; round the catafalque before it the household of the emperor were seen clad in robes of deep mourning; and while the mass for the dead was being sung, the emperor came forward and gave up his taper into the hands of the celebrant priest in token of his readiness to surrender his soul into the hands of his Maker.

The rest of the day, after having dined, he spent in the open air of the court, and the heat of the sun as it beat on the white walls gave him a violent headache. But the next morning he was better, and said that the ceremony of the previous day had done him good. Later in the afternoon he was found to be suffering from fever, and was carried to his bed, which he never left during the three weeks which were yet to pass before his death.

(32) James the Second and the Duke of Monmouth, Uncle and Nephew.

The sudden changes from splendour to wretchedness, and from high hope to utter despair, which meet us in the history of every age, have seldom been more

vividly exhibited than in the career of the favourite son of Charles II. The better qualities of the ill-starred Duke of Monmouth will be familiar to all readers of Sir Walter Scott's tale of *Old Mortality;* and the picture, it may fairly be said, is in no way overdrawn. His weakness was shown when he allowed interested and selfish advisers to entangle him in a desperate enterprise, by claiming a throne to which nothing less than his election by the whole people could give him the smallest title. The story of his rebellion resembles the course of a day which, bright and glowing at the first, becomes soon clouded and stormy, and Monmouth had little of the power which can stand out against or retrieve disaster. His reception at Taunton, where a train of girls presented him with a flag embroidered with the signs of royal dignity, shows him as the champion of Protestantism. Accepting the Bible presented to him, Monmouth said that it was his mission to defend the truths contained in that book, and to seal them, if it must be so, with his blood. A few days later, after the fatal catastrophe at Sedgemoor, he was brought, with his hands tied behind his back, into the presence of the King, his uncle, whom in his declaration he had denounced as the poisoner of his brother and the murderer of other men. His bravery was now all gone, and his one prayer was for his life; but if Monmouth lowered himself by his entreaties, James the Second sank still lower by the cruelty which prompted him to see his nephew when he had made up his mind not to spare him. To his reasons for not sparing him it was impossible for Monmouth to make any reply. All that he could do was to try and shift the guilt upon others, by pleading his ignorance of the contents of the declaration to which he had subscribed his name. This, James coldly said, was past all belief, and Monmouth felt that his only chance was to hint at his readiness to adopt his uncle's faith. He spoke of submitting himself to the Church of Rome, and James eagerly offered the spiritual assistance of which he might stand in need. Monmouth waited a few moments for some more cheering promises of mercy, but none came. 'Is there, then, no hope?' he asked. James was silent; and Monmouth, seeing that the die was cast, rose up and moved firmly from his presence. Two days later the last scene of the terrible drama was enacted on Tower Hill. The axe fell on Monmouth's neck; but in many parts of the country men were slow to believe that the prince, whom their reverence had exalted into a hero, was gone, and for them Monmouth passed into the illustrious band which numbers in its ranks the English Arthur and Harold, Sebastian of Portugal, the Tells of Rütli, and the Moor Boabdil. All these had only vanished for awhile from the scene of their former greatness, but they were to return one day with more than their former strength, and take full vengeance on the enemies by whom they had been smitten down.

'How I Teach Elementary Science.'

FOURTH SCHEDULE SUBJECTS: MECHANICS.

BY RICHARD BALCHIN.

WHATEVER may be the case with other branches of knowledge, with science it is quite certain that we can't get on at all unless we agree that certain words shall carry with them absolutely definite meanings. Everybody must have found how difficult it is to talk reasonably with some people, because one minute they will be using a word to which they attach one meaning, and the next minute they will be using the same word in quite a different sense. I remember once, at York, listening to a prolonged discussion between Mr. Cooper and Mr. Holyoake. The first night was a complete failure; and for this reason: when Mr. Cooper said 'nature' he meant one thing, but Mr. Holyoake, in using the same word, meant quite another thing. And Mr. Cooper himself, at the beginning of his remarks, employed the word to signify what we commonly understand by natural objects, such as rivers, mountains, trees, etc.; while at the end of his speech, in what the people called a peroration, he used the word to mean some 'beneficent intelligence' whose will has produced these objects. And so the want of attaching definite meanings to terms landed these two travellers after truth in a perfect quagmire of tomfoolery. In remarkable contrast to this looseness in the use of words, I may instance two exceedingly thoughtful lectures I heard a few sessions ago at the London Institution: one by Huxley, on the place of the 'Belemnite' among cephalopoda; and the other by Procter, on the 'Birth of Worlds.' There was one characteristic of these lectures that intensely charmed and delighted me: the extreme care in the use of words. 'Tissue' always meant 'tissue' and nothing else. 'Heat' always meant 'motion of atoms.' It was never used to signify the cause of heat, nor the effects of it, but the thing itself. 'Secretion' stood for one definite idea: it was never confused with 'concretion.' The result was, I came away with a fresh stock of accurate knowledge. But after some of our teachers have given their lesson, I often wonder in what way the boys are benefited by it. The teacher calls an 'apostrophe' an 'inverted comma' when it is *not* inverted, calls something a 'compound' when he means 'mixture,' says 'qualify' when he means 'modify,' speaks of 'atom' when it should be 'molecule,' confuses 'particle' with both 'atom' and 'molecule;' and as to the words 'force,' 'energy,' 'power,' 'work,' and 'momentum,' any one of these is applied to all manner of different things, and the hopeless jumble of ideas is quite painful to conceive. How such a chaotic confusion can produce any educative result is most hard to tell.

Having these things before me, I have always felt that the first stage in mechanics is very valuable in leading both teachers and boys to attach clearly defined meanings to words, especially to words used to signify the 'properties of matter.' To accurately distinguish, for instance, between 'elasticity' and 'flexibility;' not to confuse 'cohesion' with 'attraction;' to clearly define 'liquid' and 'fluid,' and so on. In explaining some of the properties of matter and its different states, one has frequently to use the terms 'particle,' 'molecule,' and 'atom;' hence I always devote one or two lessons to the meanings and use of these words. Afterwards I never make use of them, except to carry the precise values here given to them. I can scarcely overrate the importance of this. Some of our boys gain scholarships or in other ways continue their education after they leave our elementary schools. I wonder how much of what they have learned with us they have to *unlearn* when they 'go up higher'! They

ought not to have any. For although we profess to teach but the elements of science, still the elements should be accurate.

The following is an outline of a lesson on the terms 'particle,' 'molecule,' and 'atom.' The class consists of about fifty boys in Standards V. and VI. A piece of chalk, a magnet, a magnifying glass, and a microscope are on the table before the boys. The blackboard is up and empty. I begin the lesson.

Arthur Young, will you take this magnet and draw it gently about on the stone stairs, and when you find something sticking to it bring it in? Now, my boys, look at the sun's rays coming in at that window: can you see anything floating about in them? Ans.—Yes, sir; a lot of little bits of stuff. Yes; you can see a great number of small pieces of matter moving about. Do you think there are any such in other parts of the room? Ans.—No, sir. Ah! you are mistaken. If the sun were shining through any other window we should see them. The air is quite full of such small divisions of matter. In fact, I will explain to you in another lesson that we should not see the rays of light at all but for these little pieces. Come here, Smith. There, I have rubbed some of this chalk off on to your finger: now take the magnifying glass and tell me what you see on your finger. Ans.—A great many little pieces of chalk. Can you see with your naked eye that the chalk-mark consists of a number of little pieces? Ans.—No, sir; not very well. Now, I see, Young has brought in the magnet. Well, Arthur, what have you fished up? Anything? Ans.—Yes, sir: look! there is such a curious bunch of little bits of iron sticking on to the ends of the magnet. Indeed? Did you think you would find such things on the stairs? No, sir: I thought there was only dust. Just so; but then these little pieces of iron were part of the dust. (A boy)—Please, sir, where did they come from? (Another boy)—They came off our boots as we went up and down stairs. Yes; that is right. What other pieces, do you think, might be found among the stair-dust? Ans.—Pieces of leather, little bits of stone and wood. Yes; and the larger pieces keep to the ground, and the schoolkeeper sweeps them up. But what becomes of the very small, light pieces? Ans.—They blow about in the air. Yes; and those are what you can see in the sun's rays. But I will give you a word to mean little bit, or small division of matter. I will write it on the board. 'Particle.' Now what are we to understand by 'particle'? Ans.—Any very small piece of matter. Can you see a particle? Ans.—Yes, sir. (Another boy)—Please, sir, you can't see all particles: some are too small to be seen. Indeed? Tell me some particles that you can't see. Ans.—I could not see the particles of chalk on my finger until I used the glass. Well, what then? Ans.—Then I could see them. Just so: you *could* see them; but you said you couldn't. Ans.—I said I couldn't without the glass. Very well; still it *was* seeing them even when you used the glass; was it not? Ans.—Yes, sir.

Now, boys, what is this I hold in my hand? Ans.—A piece of chalk. You have had a few lessons on 'chalk.' Tell me what chalk is, chemically speaking. Ans.—Carbonate of lime. What is carbonate of lime? Ans.—Carbon dioxide and lime. What is the common name of carbon dioxide? Ans.—Carbonic acid. Bailey, come here and write on the board the symbol for carbonate of lime. Ans.—CaO, CO_2. Thank you: that is right. What does the Ca mean? Ans.—Calcium. And the O? Ans.—Oxygen. And the C? Ans.—Carbon. What does the O_2 stand for? Ans.—Two parts of oxygen. I will now rub some chalk on to this little piece of blue paper, and place it under the microscope. What do you think I can see? Ans.—Particles of chalk. Yes; and each particle looks like a large rough block. I can easily suppose each piece to be capable of being split up into fifty or sixty smaller pieces. Still, what would be the composition of one of these smaller pieces? Ans.—Carbonate of lime. Just so; and you would not be able to see it with the naked eye, but only with the most powerful microscope. Now we may conceive each one of these minute specks to be yet further divided, so that they could not be seen either by the naked eye nor by a microscope, yet each of these would still be carbonate of lime. I will write on the board a name for those smallest conceivable divisions. 'Molecule.' Now tell me the difference between a particle and a molecule. Ans.—A particle can be seen, although it is very small; but a molecule can only be imagined. You said just now that even a molecule of chalk was still carbonate of lime: if that is so, tell me of how many things the molecule of carbonate of lime consists. Ans.—Three. Yes. What are they? Ans.—Calcium, oxygen, and carbon. Now, remember what I told you in my last lesson, and tell me what we call those three things. Ans.—Elements. Yes; and what did I call such a substance as carbonate of lime? Ans.—A compound. Do you think you could see these very small divisions of calcium, oxygen, or carbon? No, sir. Why not? Ans.—Because they are smaller than the molecule, and we can only *conceive* of that: we can't *see* it. I will now write on the board a name for the smallest conceivable division of an element: the word 'atom.' You can tell me now the difference between a molecule and an atom. Ans.—A molecule is a division or very small part of a compound; but an atom is a division of an element. Yes. Tell me how many atoms there are in a molecule of carbonate of lime. Ans.—Three. Only three? (Another boy)—Five, sir. How do you make that out? Ans.—There are one of calcium, three of oxygen, and one of carbon. Jones, come and write out the symbol for a molecule of water. Ans.—H_2O. Yes. How many atoms have we here? Ans.—Three. Two of hydrogen and one of oxygen. Now, boys, take out your books and write out these definitions:—A particle is a very small division of matter, but not too small to be seen. A molecule is the smallest conceivable division of a compound. An atom is the smallest conceivable division of an element. (End of lesson.)

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'How I Teach Arithmetic.'

(*Continued from page* 274.)

BY WILLIAM SPENCER,

Author of 'Spencer's Exercises in Arithmetic.'

Having performed the mechanical multiplying, we settle the positions of the points by the rule as above; but besides settling the position of the point by *rule*, it is well to encourage a *rational* consideration of the result—where the point *must* be according to reason.

In the first exercise we are multiplying nearly a half (·48075) by a little over a half (·605), hence the result must be about a quarter, a little over a quarter being what we have really obtained (·29085375). Show that the point being in any other position would be irrational, as ·029+, 2·908+, 29·08+, etc. In the second exercise it might be observed that we are multiplying $8\frac{1}{2}$ nearly by about (a little over) $\frac{1}{18}$, and the product must be a little more than a half, as the result shows. In the third example we are multiplying a little over a thirtieth by a little over a third, the consequent product must therefore be somewhat over a ninetieth. Carefully consider the given result—·01225, and show that it is over a ninetieth, being nearly an eightieth, and that the point in any other position would give nonsense.

(*d*) The effective teaching of *Division* of decimals requires more labour and patient painstaking than any of the three preceding rules, requiring more penetration on the part of the learner than is required to comprehend the principle of addition and subtraction, or the rule for the position of the point in multiplication. In this case, contrary to our general practice, instead of reasoning strictly *a priori*, as we have hitherto done and shall continue to do generally, we will elucidate to some extent by the *posteriori* method, accepting the rule and explaining its universality. The general rule for the position of the point—*the quotient must have as many decimal figures as the dividend has in excess of the divisor*, we will illustrate by examples. Divide ·625 by ·25, = 2·5,—because ·625 (625 thousandths ÷ 25 hundredths or 250 thousandths) ÷ ·250 = $2\frac{1}{2}$ = 2·5; hence the quotient (2·5) has one decimal figure, being the excess that the dividend has over the divisor.

·125)4·8775(39·02	6·82)·04875(·00714+
3 75	4774
1127	·1010
1125	682
·250	3280
250	2728
	·552

We will remark on each of the two above worked-out examples. In the first example, having worked out all the figures given, precisely as if they were whole numbers, we obtain a quotient of 390, and a remainder of 25. We now settle the point according to the rule, quoted above, placing it between the 9 and the 0 = 39·0. We now bring down additional ciphers *ad libitum*, that is virtually adding them to the dividend, and consequently each will give an additional figure to the quotient. We proceed thus till the quotient either comes out, repeats or circulates, or till we have carried the result to a sufficient degree of minuteness. We will now consider the answer obtained, 39·02. We observe that the divisor is just $\frac{1}{4}$, and the dividend nearly 5, and nearly 5 divided by $\frac{1}{8}$ must be *about* 40. Here show that any other position of the point would give an absurdity: 3·902, ·3902, 390·2, etc.

In the second example worked out above we first perform the mechanical operation on the figures given, and obtain the figure 7 as the result. Applying the rule, we find that the quotient must have *three* decimal figures, consequently we must make up the number by adding two ciphers to the left of the 3, giving ·007. Although repeatedly cautioned that ciphers to the *right* of a decimal do not at all affect its value, some of the poorer thinkers would probably give ·700 as the result. Now complete the working by bringing down as many ciphers as are thought necessary to complete the quotient, placing a + to the right to show that it does not come out clear. We will now settle the point rationally. We are dividing a little less than $\frac{1}{20}$ by nearly 7. As ·4875 is nearly $\frac{1}{2}$, ·04875 is nearly $\frac{1}{10}$ of $\frac{1}{2}$, or $\frac{1}{20}$; and $\frac{1}{20}$ divided by nearly 7 must give about $\frac{1}{140}$, certainly it must be less than $\frac{1}{100}$ or ·01, hence there must be two ciphers before the 7. As before, show that the point cannot according to common sense be in any other position, by trying other positions, and remarking accordingly.

Examples should be given requiring the point to be in every conceivable position, and its position determined both by rule and reason. Divide ·000007 by ·00035 = ·02; ·03654 ÷ ·000018 = 2030; 21973 ÷ ·0073 = 3,010,000; ·0046178 ÷ 380 = ·00001215+; etc.

(*e*) In *converting vulgar fractions into decimals* we are only following the principle just laid down with regard to division. Thus, $\frac{3}{5}$ = (3 ÷ 5) = ·6, as a cipher must be added to the 3 in order that 5 may go in it, hence the result ·6, not 6. Again, $\frac{4}{25}$ = (4 ÷ 25) = ·16; $\frac{7}{125}$ = (7 ÷ 125) = ·056; etc. Hence the rule, *Add ciphers to the numerator, and divide by the denominator.* Caution here that a cipher will be required in the decimal obtained for every cipher added to the numerator until a vital figure is obtained. In the last example, as 125 will not go in 70, the result is ·056, not ·56, which, being more than $\frac{1}{2}$, would be absurd; and $\frac{3}{10000}$ = ·000075, $\frac{7}{20}$ = ·0034+, etc.

(*f*) Bringing *a decimal fraction of a higher denomination to its integral value in lower denominations* is such a simple process as to call for few remarks. In fact it is only acting out the dictum we have previously uttered, that decimal numbers may be worked precisely as whole numbers. Examples: Find the value of £·7875, of ·02375 ton, and of ·00885 of £150.

£ ·7875	ton. ·02375	·00885
20	20	150
s. 15·7500	cwt. ·4750	£ 1·3275
12	4	20
d. 9·00	qr. 1·900	s. 6·5500
	28	12
	lb. 25·2	d. 6·60

Hence the three answers are respectively 15s. 9d., 1 qr. $25\frac{1}{5}$ lb., and £1 6s. $6\frac{3}{4}$d. In the second example we have brought the decimal of a ton to cwts., no whole ones, then this decimal of a cwt. to quarters, and lastly the ·9 qr. to lbs.

(*g*) We now take the exact converse of this operation, and *bring a number, either integral or decimal, of a lower denomination to the decimal of a higher denomination.* As explanatory examples we will take the reverse of the first two of the three just worked out. Bring 15s. 9d. to the decimal of a £, and 1 qr. $25\frac{1}{5}$ lb. to the decimal of a ton.

(1)	(2)
12)9·00 d.	28)25·2 lb.
20)15·75 s.	4)1·9 qr.
£·7875 Ans.	20)·475 cwt.
	·02375 ton. Ans.

Here, in the first example, we have first brought the 9d. to the decimal of a shilling = ·75s., to the left of which we have placed the 15 shillings, giving 15·75s., which divided by 20 gives the required result. The second example needs no further explanation. Further examples: Bring 1s. $3\frac{3}{4}$d. to the decimal of £500, and bring 5 days 11 hrs. 27·6 mins. to the decimal of a week.

(3)

4)3·0 farthings.
12)3·75 pence.
20)1·3125 s.
500)·065625 £.
·00013125 Ans.

(4)

60)27·6 mins.
24)11·46 hrs.
7)5·4775 days.
Ans. ·7825 week.

A boy who could manipulate decimals pretty readily would make short work of example 3: he would simply put down the 3·75 pence, divide it by 12, giving ·3125s., affix the whole shilling, = 1·3125s., and then divide by 10,000, the number of shillings in £500; that is, he would move the point four places to the left, and obtain the correct result. Example 4 can be followed without any further remarks.

(h) We will now consider *repeating* or *recurring* decimals. We find in bringing some vulgar fractions to decimals that the result does not terminate, but either repeats the same figure, or a group of the same figures; thus $\frac{1}{3}$ becomes ·333, etc., and $\frac{3}{7}$ becomes ·428571 recurring. When the same single figure recurs it is called a *repeating* decimal, and when the same batch of figures recurs it is called a *circulating* decimal. This recurring is expressed by placing a point vertically over a repeater, and over the first and last figures of a circulator; thus the above are expressed ·$\dot{3}$ and ·$\dot{4}28571\dot{4}$ respectively. When the recurring figures commence immediately from the point they are called pure recurrers as the above, and when one or more figures intervene between the point and the recurring figures they are called impure or mixed; thus ·8$\dot{3}$ is an impure repeater, and ·7645$\dot{3}$ is an impure circulator.

As recurring decimals are often turned into vulgar fractions in order to be more easily worked, or for any other purpose, we will take a few examples. First show that a pure recurrer has 9 or a succession of nines—99, 999, etc.—for its denominator, the recurring figures themselves being the numerator; thus, $\frac{1}{9} = \frac{3}{9} =$ ·$\dot{3}$, $\frac{5}{11} = \frac{45}{99} =$ ·$\dot{4}\dot{5}$, etc. For the conversion of an impure recurrer to a vulgar fraction I shall simply state the ordinary rule, referring the reader for its theory to any of the standard arithmetics—Colenso's, Fitch's, Barnard Smith's, Mansford's, etc. We will quote the rule, and apply it. Subtract the part that does not repeat from the whole for the numerator, and for the denominator place a cipher (to the right) for every non-repeating figure, and a nine for every repeating figure; *e.g.*, bring ·8$\dot{3}$ to a vulgar fraction: 83 − 8 = 75 the numerator, 90 will be the denominator, hence we have $\frac{75}{90} = \frac{5}{6}$. Bring ·48$\dot{6}$ to a vulgar fraction: 486 − 4 = 482 for numerator, and 990 for denominator, hence $\frac{482}{990} = \frac{241}{495}$. Bring ·34749 to a vulgar fraction: 34749 − 34 = 34715 the numerator, and 99900 the denominator, hence $\frac{34715}{99900} = \frac{6943}{19980}$.

Although the most common device for working recurring decimals is to convert them into vulgar fractions, other devices are also resorted to, such as in multiplying a repeater 'carrying' the number of *nines* instead of tens, and in multiplying circulators of two, three, or more figures, carrying respectively the number of 99's, 999's, etc.

(i) The teaching of decimals would be incomplete did we not consider some system of *Decimal Coinage*, a subject which has commended itself to the favourable consideration of a large proportion of the more intelligent of the commercial community for many years, but which hitherto has only received the cold shoulder from statesmen in power, under the plea that the people are not yet equal to the change educationally; a plea of twenty years' standing at least, to my certain knowledge. When brought again to the front in May last, in connection with the Metric System of Weights and Measures, to which we will not further refer at the present, it was more cavalierly and curtly treated than usual. My own impression is that it might be advantageously introduced at once, and that the little inconvenience at first to the uneducated would soon be overcome. Two systems have received consideration, the first making the £ the unit or basis, and the latter the penny. As the former is undoubtedly the preferable, and the more favourably received generally, it only is generally taught in schools.

In giving a first lesson I put down on the board (say) £1·111, and remark that here we have £1 + £$\frac{1}{10}$ + £$\frac{1}{100}$ + £$\frac{1}{1000}$. I now suppose that we wish to represent these different items each by a separate coin. Well, we have the sovereign, and we have also the florin = £$\frac{1}{10}$. Hence we have already, without any addition to or alteration in our coinage, two out of the four coins we require. We now want another coin, to be £$\frac{1}{100}$ or $\frac{1}{10}$ florin, which it is proposed to call a *cent*, = $2\frac{2}{3}$d. or 2·4d., and which, if made of silver, would be somewhat less than a threepenny piece, but if made of bronze (copper), nearly $2\frac{1}{2}$ times the size of a penny. The mechanical difficulty—being too small or too large—might, however, be overcome by making it of an alloy, or better still, perhaps, by silver embedded in bronze. As this matter does not, however, affect the ostensible objection—educational deficiency—we proceed to the next required coin. We now require a coin to be worth £$\frac{1}{1000}$, $\frac{1}{100}$ florin, or $\frac{1}{10}$ cent, which has received the name *mil*. As 960 farthings = £1, a mil would be a little less in value, just $\frac{24}{25}$ of one. The farthing, where not obsolete as it is fast becoming as a circulating coin, might still remain current as a mil, since the commercial price of copper varies far more from year to year, or much shorter intervals, than the difference between a farthing and a mil. Examples: Read off (1) £8·625, (2) £·7485, (3) £·08475, (4) £·007625, in decimal coinage. (1) Here we have 6 tenths or *florins*, 2 hundredths or *cents*, and 5 thousandths or *mils*; hence the total is £8 − 6 fls. 2 cts. 5 mils. (2) 7 fls. 4 cts. $8\frac{1}{2}$ mils. (3) 8 cts. $4\frac{3}{4}$ mils. (4) 7·625 mils. = $7\frac{5}{8}$ mils.

Hence to convert any amount from current money (£ s. d.) to decimal coinage, we have only to express the amount decimally in £'s, as explained under *(g)*, and then read off as above. Thus 18s. $4\frac{1}{2}$d. = £·91875 = 9 fls. 1 ct. $8\frac{3}{4}$ mils.; 2s. $8\frac{1}{4}$d. = £·134375 = 1 fl. 3 cts. 4·375 (or $\frac{3}{8}$) mils.

To convert decimal coinage into present money is so self-evident that a boy of ordinary capacity would do it of his own accord. 8 fls. 5 cts. 5 mils. = £·855 = 17s. $1\frac{1}{2}$d.; 4 fls. 8 cts. $7\frac{3}{4}$ mils. = £·48775 = 9s. 9·06d. = 9s. $9\frac{3}{50}$d.

(To be continued.)

PROPOSALS FOR REVISION OF CODE.

GENERAL.

The references in brackets [ ] are the Articles of the existing Code affected by the changes.

[Article 19 B]—1. It is proposed to adopt the average attendance in each school as the basis of the grants which have hitherto been made on account of individual scholars, whether infants (under 7 years of age) presented to H.M. Inspectors for collective examination, or children above 7, presented for examination in reading, writing, and arithmetic.

2. 250 attendances will be no longer required as a condition of examination, but all scholars who have been on the registers for six months will (unless there is a reasonable excuse for their absence) have to be presented to the Inspector.

3. The grants will be so assessed that the present average rate of aid will, as far as possible, be maintained.

The rate at which each item of the grant will be assessed cannot yet be stated. It is also desirable that, for the present, attention should be directed to the educational, rather than to the financial, effects of these proposals.

GRANTS COMMON TO ALL SCHOOLS.

4. *Music.*—The full grant will be paid if singing is satisfactorily taught from notes, or according to the Tonic Sol-fa system. One half only will be paid if singing is taught by ear.

5. *Sewing*, according to the revised needlework schedule (*annexed hereto*), will be compulsory for all girls, and for boys below seven years of age. A special grant will be made, calculated on the average attendance.

6. *Special Merit.*—The Inspector shall have regard to (*a*) the organisation and discipline; (*b*) the employment of intelligent methods of instruction; and (*c*) the general quality of the work in each school, especially in the Standard examination; and shall have power to recommend an additionel grant on the average attendance, varying in amount according as the school is, in these respects, fair, good, or excellent.

INFANT SCHOOLS.

7. All grants save those for pupil teachers (Article 19 E of the present Code) will be based on the average attendance.

8. When the infants in a school amount to 40, a separate adult teacher will be required for their instruction. For more than 60 infants a certificated teacher will be required.

9. Part of the grant for infants will be made to depend upon their being taught by special methods, providing for—

(1) Appropriate and varied occupations.
(2) Suitable instruction in the rudiments of reading, writing, and arithmetic; and
(3) A systematic course of simple lessons on objects, and on the phenomena of nature and of common life.

10. Infants, between six and seven, may, at the discretion of the Inspector, be examined individually according to Standard I. of the Code of 1870.

11. If any scholars in an infant school are taught in Standard I. they will be examined and paid for as in schools for older children.

[*Standard I., Code* 1870. *Reading.*—Narrative in monosyllables. *Writing.*—Form on black-board or slate, from dictation, letters, capital and small, manuscript. *Arithmetic.*—Form on black-board or slate, from dictation, figures up to 20; name at sight figures up to 20; add and subtract figures up to 10; orally, from examples on black-board.]

BOYS' AND GIRLS' SCHOOLS.

[Article 19 B.]—12. Payments on the passes of individual scholars will be abolished; and 250 attendances will no longer be required as a condition of examination.

13. All scholars on the registers are to be present at the inspection, unless there is a reasonable excuse for absence; and all such children, who have been six months and upwards on the registers, are to be presented for examination.

14. The grant will be calculated on the results of the examination of these scholars. It will be based upon the proportion of passes actually made to those that might have been made by the scholars examined.

15. The Inspector will examine—

(*a*) All scholars presented in the standard, fixed by the bye-laws of the district, for half-time labour.
(*b*) All scholars presented in Standard III., and upwards.
(*c*) Any child, whether a scholar in the school or not, who desires to pass in either of the standards fixed by the bye-laws of the district, for total or partial exemption from attendance at school.
(*d*) In Standards I. and II. (unless either of these is the standard for half-time labour) such a number of scholars as will enable him to estimate the quality of the instruction in each of the three elementary subjects.

16. A *Seventh* Standard is introduced. (*See Examination Schedule annexed hereto.*)

17. If any scholar over ten years of age is, after the 1st of April, 1883, presented in the 1st or 2nd Standard, the passes made by such scholar will not be reckoned in calculating the percentage of passes for the purpose of a grant.

CLASS SUBJECTS.

18. A school will be regarded as made up of two divisions—
In the lower division—Standards I.-IV.
In the upper division—Standard V. and upwards.

19. Two class subjects may be taken up in each division.

20. English (grammar and recitation), geography (including physical geography), and elementary science will alone be recognised as class subjects in the lower division.

21. If only one class subject is taken, in the lower division, it shall be English; if two are taken, the second shall be either geography or elementary science.

22 *History.*—One of the reading-books in use in each Standard, from the third upwards, must be an historical reading-book, adapted to the ages of the scholars in the standard.

23 The upper division may take, as class subjects, any of the three subjects to which the lower division is restricted, or history, or a specific subject.

[Article 19 C.]—24. The grant for class subjects will be made, as now, on the average attendance, and an increased grant will be paid if 20 per cent. of the scholars examined are presented in Standard IV. and upwards.

SPECIFIC SUBJECTS.

25. The following will be specific subjects:—1. Algebra; 2. Euclid; 3. Mechanics; 4. Latin; 5. French; 6 Animal Physiology; 7. Botany; 8. Principles of Agriculture; 9 Domestic Economy.

26. English and Physical Geography are removed to the category of class subjects. Algebra and Euclid are separated. The Principles of Agriculture are added to the list of specific subjects.

The Principles of Agriculture will also be made an optional subject in the course of instruction for—1. Pupil Teachers; 2. Students in training colleges.

27. These subjects will not be begun before the Fifth Standard. The examination and payments will be individual.

28. No scholars will be examined in specific subjects, if the percentage of actual to possible passes in the elementary subjects at the previous inspection was less than 75, and no grant will be paid if the same percentage is not reached at the close of the year for which the grant is claimed.

[Article 21 *f*] 29. Domestic economy will no longer be required to be taken up by girls as a condition of being examined in specific subjects.

NIGHT SCHOOLS (ARTICLE 22).

30. Grants will no longer be confined to reading, writing, and arithmetic, but will be made also for proficiency in class subjects.

31. Grants will be paid in respect of those children only who, having passed the standard fixed by the bye-laws of their district for total exemption, are under no obligation to attend school, and are not day scholars.

[Article 42]—32. The teacher of a night school need not be a layman.

TEACHERS.

[Article 19 E.]—33 The special grants to pupil teachers for proficiency at their annual examinations will be continued.

[Article 70 *g*.]—34. Not more than three pupil teachers will be allowed in any school or department, whatever number of certificated teachers may be employed in it.

35. Stipendiary monitors will no longer be recognised. Candidates for engagement as pupil teachers will be required to pass in Standard V. or VI., with some elementary knowledge of grammar and geography.

[Article 32 *c*.]—36. In calculating the staff of a school, an assistant teacher will count as sufficient for sixty scholars, instead of eighty as heretofore.

37. No teacher examined at, or after, Christmas 1882 will be allowed to have pupil teachers who has not passed in the papers of the *second* year. A candidate who takes *first* year's papers will not obtain a certificate above the *third* class. He will be

allowed to be re-examined, in second year's papers until he obtains a higher certificate, but not more than once every three years.

38. The annual entries made by the Inspectors on teachers' certificates will be discontinued after they have been raised to the first class. To enable a teacher to present to school managers, who wish to employ him, a record of his services after he has reached the first class, he will be entitled to claim, from the managers of his school, a certificated copy of the Inspector's yearly report when it is entered in the log-book.

[Article 79.]—39. Graduates of any University in the United Kingdom, and women who have passed certain of the higher examinations held by the Universities, may be recognised as assistant teachers, and will be admissible to examination for certificates, after serving as assistants for one year in a school under inspection, if the Inspector reports favourably of their skill in teaching reading, and needlework (*women*).

40. Certificates will no longer be granted without examination under Article 59 of the Code.

[Article 69.]—41. No certificate will be cancelled, suspended, or reduced until the department has informed the teacher of the charges against him, and has given him an opportunity of explanation.

MISCELLANEOUS.

[Article 19.]—42. Honour certificates, and the payment of the fees of children who hold such certificates, will be discontinued.

[Article 19.]—43. The production of a Child's School Book will no longer be required as a condition of the payment of annual grants.

Education Department, F. R. SANDFORD.
5th August, 1881.

SCHEDULES.

STANDARDS OF EXAMINATION IN ELEMENTARY AND CLASS SUBJECTS.

Article 28.

*Reading.—Standard I.—To read a short paragraph from a book not confined to words of one syllable. Standard II.—To read a short paragraph from an elementary reading book. Standard III.—To read a passage from an advanced reading book, or from stories from English history. Standard IV.—To read a few lines of poetry or prose, from a reading book, or history of England, used in the School. Standard V.—To read a passage from some standard author, or from a history of England. Standard VI.—To read a passage from one of Shakespeare's historical plays, or from a history of England. Standard VII.—To read a passage from Shakespeare or Milton, or from a history of England.

†Writing.—Standard I.—Copy in manuscript characters a line of print, and write from dictation ten easy words, commencing with capital letters. Copy books (large hand) to be shown. Standard II.—A passage of not more than three lines, from the same book, slowly read once, and then dictated word by word. Copy books (large and half-text hand) to be shown. Standard III.—Six lines from one of the reading books of the standard, slowly read once, and then dictated. Copy books (capitals and figures, large and small hand) to be shown. Standard IV.—Eight lines of poetry and prose, slowly read once, and then dictated. Copy books to be shown. Standard V.—Writing from memory the substance of a short story read out twice; spelling, handwriting, and correct expression to be considered. Copy books to be shown. (N.B.—An exercise in dictation may, at the discretion of the inspector, be substituted for composition.) Standard VI.—A short theme or letter on an easy subject; spelling, handwriting, and composition to be considered. Copy books and exercise books to be shown. Standard VII.—A theme or letter; composition, spelling, and handwriting to be considered. Note books and exercise books to be shown.

‡Arithmetic.—Standard I.—Notation and numeration up to 1,000. Simple addition and subtraction of numbers of not more than three figures. In addition not more than five lines to be given. The multiplication table to 6 times 12. Standard II.—Notation and numeration up to 100,000. The four simple rules to short division. The multiplication table and the pence table to £1. Standard III.—The former rules, with long division. Addition and subtraction of money. Standard IV.—Compound rules (money) and reduction of common weights and measures§. Standard V.—Practice, bills of parcels, and rule of three by the method of unity. Addition and subtraction of proper fractions, with denominators not exceeding 20. Standard VI.—Fractions, vulgar and decimal; proportion and interest. Standard VII.—Averages, percentages, discount, and stocks.

* Reading with intelligence will be required in all the standards, and increased fluency and expression in successive years. Three sets of reading books should be provided in each standard; of which, after Standard II., one should relate to English history. The Inspector may examine from any of these books. The intelligence of the reading may be tested partly by questions on the meaning of what is read.

† The writing and arithmetic of Standards I. and II. may be on slates or paper, at the discretion of the managers; in Standard III. and upwards it must be on paper.

‡ The work of girls will be judged more leniently than that of boys, and the Inspector may examine scholars in the work of any Standard lower than that in which they are presented, and in mental arithmetic suitable to their respective Standards. The object of the exercise in mental arithmetic is to encourage dexterity and correctness in computation; and to anticipate, by means of rapid and varied oral practice with small numbers, the longer problems which have to be worked out in writing in the following year. Such exercises should, from the first, deal with concrete as well as with abstract numbers.

§ The 'weights and measures' should be such only as are really useful—*e.g.*, avoirdupois weight, long measure, liquid measure, time measure, square and cubical measure, and any measure connected with the industrial occupations of the district in which the school is situated.

* CLASS SUBJECTS.—Article 19 c.

I. English.—Standard I.—To learn by heart 20 lines of simple verse, and to know their meaning. Standard II.—To learn by heart 40 lines of poetry, and to know their meaning. To point out nouns and verbs. Standard III.—To recite with intelligence and expression 60 lines of poetry. To point out nouns, verbs, adjectives, adverbs, and personal pronouns, and to form simple sentences containing them. Standard IV.—To recite 80 lines of poetry, and to explain the words and allusions. To parse simple sentences, and to illustrate the use of each of the parts of speech. Standard V.—To recite 100 lines from some standard poet, and to explain the words and allusions. To parse and analyse simple sentences, and to know the method of forming English nouns, adjectives, and verbs from each other. Standard VI.—To recite 150 lines from Shakespeare or Milton, and to explain the words and allusions. To parse and analyse complex sentences, and to know the meaning and use of Latin prefixes in the formation of English words. Standard VII.—To recite 200 lines from Shakespeare or Milton, and to explain the words and allusions. To analyse sentences, and to know prefixes and terminations generally.

II. Geography.—Standard I.—The meaning and use of a map. A plan of the school and playground. The four cardinal points. Standard II.—The size and shape of the world. Geographical terms simply explained, and illustrated by reference to the map of England. Physical geography of hills and rivers. Standard III.—Physical and political geography of England, with special knowledge of the district in which the school is situated. Standard IV.—Physical and political geography of the British Isles, British North America, and Australasia, with knowledge of their productions. Standard V.—Geography of Europe, physical and political. Latitude and longitude. Day and night. The seasons. Standard VI.—Geography of the world generally. Interchange of productions. Circumstances which determine climate. Standard VII.—The ocean. Currents and tides. General arrangement of the planetary system. The phases of the moon. [In Standards V., VI., and VII., maps and diagrams may be required to illustrate the answers given.]

III. Elementary Science (a course of simple lessons on).—Standard I.—Animals and common objects. Standard II.—The colours and shapes of familiar objects; the uses of common substances employed in the arts and manufactures; and the habits of domestic animals. Standard III.—(*a*) Animals and plants, *or*, (*b*) Some simple machines, *or*, (*c*) The properties of air and water. Standard IV.—(*a*) General comparison of the chief classes of quadrupeds, *or* (*b*) The processes employed in one of the chief industries in England (of which agriculture may be reckoned for this purpose as one), *or*, (*c*) Light and heat. Standard V.—(*a*) General comparison of the chief divisions of the animal kingdom, *or*, (*b*) The processes employed in two of the chief industries of England (of which agriculture may be reckoned for this purpose as one), *or*, (*c*) Gravitation, weight, and specific gravities. Standard VI.—(*a*) Distribution of plants and animals, *or*, (*b*) The common pump, barometer and thermometer, pulleys, and levers, *or*, (*c*) The laws of motion. Standard VII.—(*a*) The races of mankind, *or*, (*b*) The construction of the steam engine, and its application to agriculture or manufactures, *or*, (*c*) Some of the ordinary chemical combinations of frequent occurrence in nature.

NEEDLEWORK SCHEDULE.

GIRLS' AND INFANTS' DEPARTMENTS.

BELOW STANDARD I.

Boys and Girls.

Needle drill.—Position Drill.

Strips (18 inches by 2 inches) in simple hemming with coloured cotton, in the following order, viz.:—1. Black. 2. Red. 3. Blue.

Knitting-pin drill.

A strip knitted (15 inches by 3 inches) in cotton *or wool*.

STANDARD I.

1. Hemming, simple *or counter*, seaming, felling, *plaiting*. Any garment which can be completed by the above stitches, *e.g.*, a child's plain shift or pinafore.

2. Knitting. 2 needles, plain and purled, *e.g.*, a strip on which to teach darning in Girls' Upper Standards, or a comforter or muffatee.

STANDARD II.

1. The work of the previous Standard with greater skill, and sewing on strings. Garment, an apron, pinafore, or plain shift plaited into a band.

2. Knitting. 4 needles, plain and purled, *e.g.*, wristlets or muffatees.

STANDARD III.

1. The work of the previous Standards with greater skill, and in addition, stitching garment, a shift or apron plaited into a stitched band.

Herring-bone stitch. The stitch only on coarse canvas (cheese cloth) or flannel.

Darning, simple } On cheese cloth or calico.
Marking, simple }

2. Knitting. 4 needles, *e.g.* a sock.

STANDARD IV.

1. The work of the previous Standards with greater skill, and, in addition, gathering, stroking, setting-in, *herring-bone*, marking, button-hole, sewing on button. Garment, a plain night shirt, night gown, petticoat, or child's frock, either in calico, coloured shirting, or flannel.

2. Darning, plain (as for thin places), in stocking-web material and woven fabric.

3. Knitting. 4 needles, a man's sock or girl's stocking.

STANDARD V.

1. The work of the previous Standards with greater skill, and, in addition, tuck run. Garment, a night gown or child's frock.

* The children in Standards V., VI., and VII. may, if grouped together for teaching be examined in one or two groups, and each such group may be examined in the subjects fixed by the schedule for any one of the Standards included in it, provided that the subjects chosen for the examination of each group shall follow one another in regular order from year to year.

If any other class subjects are taken for the examination in Standard V. and upwards, a graduated scheme of teaching them must be submitted to the Inspector, and approved by him at the previous inspection.

2. Knitting. 4 needles, a knickerbocker stocking.
3. Darning, simple, and a hole in stocking-web material.
4. Patching in calico and flannel.
5. Cutting out any garment such as a child in Standard III. can make up.

STANDARDS VI AND VII.

1. The work of the previous Standards with greater skill, and whip stitch, setting-on frill, *knotting*, coral-stitch (feather-stitch). Garment, a night dress with frill, or baby's robe, or child's fancy pinafore.
2. Darning, plain and Swiss, and grafting on stocking-web material.
3. Patching and darning on woven fabrics, *e.g.*, calico, flannel, serge, &c.
4. Knitting. 4 needles, a long stocking with heel thickened.
5. Cutting out any under-garment suitable for making up in Standard IV.

NOTES.

1. The work printed in *italics* is optional.
2. Boys below seven, in Infant Departments, must do the same work as the girls.
3. Counter-hem is not necessary where seaming can be done.
4. Garments must be shown in each stage, but not necessarily those specified in this Schedule, which are mentioned merely as examples. They must be presented in the same condition as when completed by the scholars.
5. A garment made by more than one child may be presented, provided that as many garments are shown as there are girls examined.
6. Girls should fix their own work in the earlier stages, and must do so in the fourth and higher stages.

Pupil Teachers (Girls).

Pupil teachers of the first year will be expected to work well, and to be able to teach all that is required in the first three standards, and to advance a standard in each successive year of their engagement. Some further special work will hereafter be prescribed for pupil teachers each year.

FIRST SCHEDULE.

QUALIFICATIONS AND CERTIFICATES OF PUPIL TEACHERS AT ADMISSION AND DURING THEIR ENGAGEMENT.

Candidates for pupil teacherships must be not less than fourteen years of age, must be presented to the Inspector on the day of the school examination, and must pass satisfactorily in the Fifth or Sixth Standard, and in the elements of grammar and geography. They must produce medical certificates that they are not subject to any infirmity likely to interfere with their duties as teachers; and also certificates from the managers of the school of good conduct and character. Similar certificates of health will be required at the end of the second year, and certificates of conduct and character at the end of each successive year.

End of First Year.

Reading and Repetition.—To read with fluency, ease, and just expression, and to repeat 50 lines of poetry. English grammar and composition.—Parsing and analysis of simple sentences, with knowledge of the ordinary terminations of English words. Writing from memory the substance of a passage of simple prose, read with ordinary quickness. Arithmetic and mathematics.*—Boys: Vulgar and decimal fractions, with their applications. Girls: Practice, tradesmen's and household accounts. Measures and multiples, with addition and subtraction of vulgar fractions. Geography†.—The British Islands, Australia, and British North America. Physical geography of mountains and rivers. (Maps to be drawn in this and the following years.) History†.—Outlines of British history, from Julius Cæsar to the Norman Conquest. Teaching.—To conduct a class in reading, writing, or arithmetic.

End of Second Year.

Reading and Repetition.—To read as above, and to recite 80 lines of poetry, with knowledge of meanings and allusions. English grammar and composition.—Parsing and analysis of sentences, with knowledge of the chief Latin prefixes and terminations. Paraphrase a short passage of poetry. Arithmetic and mathematics*.—Boys: Proportion, with its applications to interest, averages, percentages, and stocks. Geometry to Prop. XXVI. of Euclid, Book I. Girls: Vulgar fractions, with their applications to money, weights, and measures. Reduction of vulgar fractions to decimals. Geography†.—Europe and British India. Climate and productions of the British possessions. History.†—From the Conquest to the accession of the Stuarts. Teaching.—To conduct a class in reading, writing, or mental arithmetic (in an infant school on form, colour, number, or some familiar object).

End of Third Year.

Reading and Repetition.—To read as above, and to recite 100 lines of poetry, with knowledge of meanings and allusions. English grammar and composition.—Parsing, analysis, and paraphrase of complex sentences. Prefixes and affixes generally. Knowledge of the simple tests by which English words may be distinguished from those of foreign origin. Arithmetic and Mathematics.*—Boys: Arithmetic, generally, including the extraction of the square root, mensuration of triangles and parallelograms. Euclid, Book I. Algebra to simple equations (inclusive). Girls: Decimals and simple proportion. Geography†.—Asia and Africa. Latitude and longitude. Winds and tides. History†.—From the accession of the Stuarts to the present time. To conduct a class in grammar or geography (in an infant school on form, colour, number, or some familiar object), and to prepare notes of a lesson.

End of Fourth Year.

To read as above, and to recite 100 lines of Shakespeare or Milton with clearness and force, and knowledge of meanings and allusions. *N.B.*—The passages for repetition must be of a secular character, and taken from some standard English writer approved by H.M. Inspector. The meanings and allusions, if well known, will atone for deficiencies of memory. English grammar and composition.—Fuller knowledge of grammar and analysis, and of the common Latin roots of English words. Outline of the history of the language and literature. Arithmetic and mathematics*.—Boys: Arithmetic. Euclid, Book II. Mensuration of plane surfaces. Algebra to quadratic equations (inclusive). Girls: Application of fractions and proportion to interest, discount, percentages, averages, and stocks. Geography†.—The world generally. The seasons, the sun, moon, and planetary system. History†.—The same period in fuller detail. Teaching.—To give a collective or class lesson on any subject taught in the school. To prepare notes of a lesson.

N.B.—In all the subjects questions may be given on the work of the previous years.

* The papers on arithmetic may contain questions requiring the reasons of the several rules to be explained and demonstrated as to a class of scholars.

† Pupil teachers may take the geography and history in any order which may be most convenient to the principal teacher in instructing them, provided that the requirements of all four years are fulfilled during the term of their engagement.

‡ On the occasion of H.M. Inspector's visit to the school, pupil teachers must be prepared to afford evidence of their skill in teaching needlework by a lesson given in his presence.

N.B.—Columns 9 (Additional Subjects), 10 (Drawing), and 11 (Music), will remain as at present, except that in column 9 the Principles of Agriculture will be added to the list of additional subjects, in which pupil teachers may be presented at the May examinations of the Science and Art Department.

SPEECH OF

THE RIGHT HON. A. J. MUNDELLA, M.P.,

(Vice-President of the Committee of Council on Education),

Upon Introducing the

'PROPOSALS FOR A NEW CODE'

In the House of Commons, on Monday, August 8th, 1881.

I BEG to thank the House for allowing me to make my statement with the Speaker in the chair. My reason for asking this favour of the House is twofold. Not for the sake of the estimates which I am able to submit to the House, and which I should be quite prepared to submit in the usual way. But it will be in the recollection of the House that in the other House of Parliament, when the Code under which the conditions of the grant for education are made was carried, a distinct pledge was given to both this and the other House of Parliament that before the close of this Session we would submit proposals for the reform of the Code, and it is upon that ground, before going into Committee of Supply, that I shall make a double statement, the one relating to the ordinary business of the past year, and the proposed financial statement for the coming year, and the principles on which we propose to revise the Code. All that relates to the expenditure of the past year, I shall endeavour to condense into as short a space as possible, in order not to trespass upon the time of the House. The expenditure in 1880 was as follows:—The sum granted was £2,535,967, and the expenditure £2,525,769, the result being a saving of £10,308 upon the estimates. The charge for annual grants, which was estimated at £2,217,348, reached £2,213,673, an increase of £120,232 on the previous year, the details of which are as follows:—The estimate of average attendance was 2,800,480 children, and the actual average was 2,814,000, the estimated grant was 15s. 8d.; and the grant really made was 15s. 7½d. The estimate for the evening schools for the average attendance was 52,530 children and an estimate of 9s., and the result was 41,500 at 8s. 6½d., a falling off in numbers of 11,000, and in the grant of 5d. in the year. Now, Sir, I come to the estimates that the House will be asked to vote to-night for the current year 1881-82. The sum required this year is £2,683,958, as compared with £2,535,967 granted in 1880-81. This is an increase of £147,991, and it produces a difference of £93,000 increase on the estimates of 1880-81. Although at first sight this difference will appear to be considerable, it will be understood that the increase in the expenditure was really an over-estimated expenditure in the year 1879-80. The increase on the vote for 1880-81 would have stood £140,000 instead of £55,000 on the estimates, therefore the increase on the estimates 1881-82 is £144,794, and it is a little more than an increase in the last year, which was really £140,000. The increase on the coming year 1881-82 occurs almost entirely under the head of annual grants. The amount of the votes is £2,362,142, an increase of £144,794 for the grant. It will be necessary that I shall show the House the expenditure for annual grants, and the comparison of this special head for the past three years shows that the increase asked for is not an extensive one. The annual grant made to the elementary schools in 1878-79 was £1,961,000, or an increase of £267,000 on the preceding year. In 1879-80 it was £2,093,000, or an increase of £132,000; in 1880-81 £2,213,000, or an increase of £120,000; and in 1881-82 it is £2,362,000, or an increase of £144,794. It will be noticed by the figures set forth that there is a very large increase in 1878-79, and

that was occasioned by the passing of the Act of 1876, which only came into practical operation in 1878-79. Amongst the other items there is an increase of £7,670 for expenditure this year caused by the addition of six inspectors and nine inspector's assistants, and by the usual number of inspectors being entitled to the increment. The inspectors were appointed after the details of the estimates had been made for last year, and they come into the present year. There is only one more item in reference to the expenditure that I ought to trouble the House with, and that is the building grant on the Act of 1870 for £670, and it is the last year of that grant. I now invite the House to consider the real educational progress of the past year. I may say before going into that part of the question, that there is no new or striking feature in the course of the year. There have been no new forces brought into operation during the year; we have been working steadily and quietly under the Acts of 1870 and 1876, and, as the Act of 1880 as to general compulsion did not come into operation until the 1st of January this year, the statement of progress that I have to make is the more gratifying, because the same steady, continuous, and unbroken progress of education has been going on since the passing of the Act of 1870. The principal features which I have to mention are as follows:—Accommodation is now afforded 4,240,000 children, showing an increase of 98,000 school places during the year; the scholars on the register 3,895,000, showing a remarkable increase of 185,000; scholars in average attendance 2,751,000, being an increase in attendance of 156,000 for the previous year; the scholars individually examined 1,904,000, being an increase of 144,000 in one year. The percentage of passing in the three R's, which is one of the real tests of the work done, is 81·2 as against 80·4 last year. They have now touched the highest point they have ever reached in the history of the Department. The proportion of scholars examined in Standard IV. and upwards, which is very interesting to several members, and my hon. friend the member for Wolverhampton, who I am glad to see in his usual place, is 24·61 as against 22·1 of last year, a very large amount indeed. We do not bring the children up to the higher standard; we are doing very little in the arrears of thorough education. I am as dissatisfied as any man in this House about them, but still it is gratifying to find this year that the proportion of scholars examined is increasing. Well, we have 41,426 masters, being nearly 3,000 more than heretofore, and we have 33,733 pupil teachers, and that gives an increase of 538. The cost for maintenance for scholars in Board schools is £2 1s. 11¾d., being a decrease of 1d. per head, and voluntary schools £1 14s. 7¾d., or an increase of 1¾d. per head. The rate of the grant earned is for Board schools 15s. 7¾d. per head, an increase of 4¼d. on the previous year, and for voluntary schools 15s. 5d., or an increase of 1¾d. per head. It is the first time since the passing of the Act of 1870 that the Board schools have shown any substantial increase over the voluntary schools. Now in these figures there are two or three points we have of interest, and the first is the number of scholars on the registers. Although these have gone on increasing year by year from 1,693,000 in 1870 to 3,895,000 in the past year, it shows a substantial increase of 185,000 during the past year. Now the normal increase according to the growth of the population will be about 70,000 in the year, but we continue to receive into our schools nearly three times that increase every year, and at this moment that I am addressing the House, the probability is that there are over 4,000,000 of children on the registers of the schools, and we have every reason to expect that within the next ten years, when the Act of last year comes into full operation, the numbers will not be far short of 5,000,000 children. The next question to which I must call attention is that we have gone from 1,793,000 to above 4,000,000, and we are calculating on something like, after this year, a continual increase of 200,000 children a year. The average attendance has now reached 70·6, and this includes infants—the vast number of children who only attend half-time, and who are permitted by the School Board when they pass the standard to be employed half-time. If they were full time they would not detract very much from the average of the whole, and it must make a difference in the average of the year. Considering that every year we are passing in more of the children of their regular class, and that the compulsion reaches the more neglected of the lower classes, it is more satisfactory to find that the average attendance is higher to-day than it has ever reached before. This is an indication of real and substantial progress. We have not reached, by any means, what we hope to, and may, attain, and the best proof of that is what Scotland has already done. Scotland has already reached 76 per cent. average attendance, including half-time; and there is this to be said about Scotland, that the Scotch children go to school later, but stay later than the English children. That is owing to climate, and that infant schools are not so general as in England, and it is a most satisfactory result in the School Board in Scotland that they have already brought up the average attendance to 76 per cent. Now compulsion has done this. It succeeded in bringing a larger number of children to attend schools for at least a portion of their time, and has improved the average attendance to the point to which I have stated. I have a table here which shows that it has had the effect of causing a very considerable increase of the number of scholars who attend sufficiently regular to bring the grant to the schools. Out of every hundred scholars on the register in England and Wales there were 62 per cent., and they were qualified by attendance in the proportion of 40·2. In 1880, at the same stage, 68·3 on the register, and they were qualified by attendance to the extent of 52·2. This shows a number of children who get the grant in Scotland. I am bound to say the result is much better. They had been in 1874 64·9, and at the present moment they have reached 73·6, who make full school attendance. I am approaching that which I regard as the most satisfactory feature of the year, and that is the result of last year's examinations, and it is to this point I invite my hon. friend the member for Wolverhampton. The children examined did better in the three R's than in the previous year, the percentage of passes having risen from 80·4 to 81·2; whilst the proportion of scholars examined in Standards IV. to VI., compared with the total number of scholars individually examined, rose from 22·1 per cent. to 24·61 per cent. Now, in order to show the change which was gradually coming over our educational experience, I will ask the attention of the House to this fact, that the percentage of passes to the number of children examined fell steadily during the first six years after the passing of the Act of 1870. The number of ignorant and neglected children brought in, and the number of elder children who were unable to pass the standard, was so large that there was a steady fall in the percentage of passes throughout England and Wales. In 1872 the following were the percentages:—Passes in 1872, 81·1; in 1873, 80·8; in 1874, 80; in 1875, 79·7; in 1876, 78·8; and here in 1877 we ended the trouble. There had been a steady fall; then came the rise, and the recovery was due to this, that more attention was paid to the teaching of the infant children. The interest taken in the schools had begun to effect a great change in the children's passing in the upper standards, and the number of backward children grew less and less. In 1878 the number rose to 79·5; in 1879 to 80·4; in 1880, 81·2. This is the highest point at which the number has ever stood in Standards Four to Six. Now, the test is what do you pass in the upper schools? There are bye-laws and Factory Acts which affect these. The bye-laws and Factory Acts take half our children in the Fourth Standard out of schools every year. That is to say, that 50 per cent. of the children who pass the Fourth Standard in any year pass at once out of school. That is one reason why we cannot pass our children to the higher standards, because the standard of the Factory Act is the Fourth Standard, and the standards throughout the country, especially the rural districts, are from II. to IV. or III. to V. for half-time and full time respectively. The progress which had been made in the higher standards was one of the features in the year the most gratifying. I have made out statements which show the number of children presented in the higher standards since the passing of the Act of 1870. In 1870 the number who passed under the Old Code was 191,663 to all schools. Practically, it was 102,630 taking it as compared with the Code, as we have since that time raised the standards. In 1871 we have no record, because the Code changed. Then in 1872, 118,000; in 1873,

131,000, being an increase of 13,000; in 1874, 155,000, being an increase of 24,000; in 1875, 194,000, an increase of 39,000; in 1876, 234,000, an increase of 40,000; in 1877, 270,000, an increase of 36,000; in 1878, 324,000, an increase of 54,000; in 1879, 388,000, an increase of 64,000, and last year 468,000, an increase of 80,000 children in the upper standards. (Cheers.) The increased number passed through the upper Standards IV. to VI. since 1870 was more than 400 per cent. That is the best test of the work that is really being done. However well we may be doing with the English schools, the Scotch are doing better; and in Scotland this is much more remarkable than among ourselves. The numbers for Scotland—where they have had the compulsory system in full operation since 1872, while ours has just come into full operation—shows that in 1872 they passed 35,502 children, and they finished in 1880 by passing 102,259 in the upper standards; that is to say, out of 304,000, the average attendance was one-third of the whole, or 33 per cent. in Scotland, as against 24 per cent. in England. I should like to give a single illustration of the way the Scotchmen manage their schools, showing the wonderful results that are accomplished. I was struck with the case of a school which was placed in my hands some few months ago, and it gives an illustration of what could be done under the most adverse circumstances. It was a school in the village of Easdale, in the Island of Seil, in the county of Argyll. The chief industry of the place is slate-quarries. Well, in 1874 the report was exceedingly unfavourable. In 1875 the School Board began a new school, and they appointed a new teacher, and this is the sort of progress which has been made since. In the first year only six out of 134 could be presented in the higher standards. In 1876 the school had an admirable report; in 1879, when the Inspector came, he said, "This is one of the best schools I know; there is no failure in reading and writing, and only two out of 116 failed in arithmetic, and when I visited the place some years ago the education of the children was in a lamentable state. Thanks to the wise policy of the Board and the ability of the teacher, it is now the best school in Argyll." Out of 134, only seven failed, and the Inspector said it was in all respects a model school. I think that a school and School Board making such marvellous progress as that shows, ought to be brought under the notice of the House. Now, Sir, I have given the statistics of England and Wales as to the number who have passed the upper standards. The grants earned in 1879-80 had risen from 15s. 3½d. to 15s. 7¾d., an increase of 4½d., and the voluntary schools to 15s. 5d., an increase of 1¾d. I said that this is the first time that the Board schools show an advantage over the voluntary schools, but the grant is not always the measure of success, and I say this irrespective of this circumstance in reference to Board schools and voluntary schools. It depends upon the number of infants in the respective schools on the list, for the infants bring down the average, and the real test is the children in the upper standards and the upper ages. Now the average cost in the London School Board schools was £2 17s. 7¾d. per head, and in the voluntary schools £2 0s. 10¾d. The Board schools in the provinces are only £1 17s. 5¾d. I am bound to say that the heavy cost of the London Board schools raises the average of the Board schools throughout the country. The London Board school average was £2 17s. 7¾d., and the London voluntary school £2 0s. 10¾d., against £1 14s. 2d. in the country. I am not going to be the apologist for the London School Board; there is no need for me to take up the defence of the London School Board, as it possesses able representatives in this House. I am bound to say that I was very much struck with that, and I made it my business to institute inquiries as to the cost of the London Board schools as compared with other schools. Now it is only fair, whatever may be said in favour of voluntary schools or Board schools, that it should be fairly and honestly stated. I find that the London Board schools are increasing at the rate of 23,000 a year for the last ten years; that for every year they have to furnish schools and charge that upon the current year's account. Then again, unlike any other Board schools in the country, they have to bear the expense without the grant for this 23,000; so that really, to take the proper average, we believe that it would be impossible to get the cost of the London Board schools until the London Board schools have supplied all this deficiency of education and the children are in average attendance. Then the grant for salaries is very considerable. Then, taking the average of the country schools, no allowance is made in the salaries, but a residence is provided for the masters, whereas in London the residence of the masters is to be paid out of their salaries. That is only fair to be borne in mind; but to show the vast work which the London School Board has yet to do—for it is a vast work, for the deficiency is not nearly supplied, and the new census has shown us that Lambeth alone has increased nearly a quarter of a million during the last ten years—there is the population of one of our great towns, and the London School Board have to keep up with the growth of the population, and this growth represents something like 1,100 persons a week, and in order to make provision for the population they must open one school a month. That is the only way in which the population of London can be provided for. The only wonder is that, looking at the vast work already done, and yet remains to be done, how we could have remained content with such a state of things as must have existed. The total expenditure on education for last year amounts to £5,078,259; to this sum the endowment has contributed £143,000, the voluntary contributions about £731,000; the rates £726,000. Though it is fair to notice that the contributions are still in excess of the rates, it is a most creditable feature. The children's pence contributed £1,431,000, and the Government grant £1,982,000, and the receipts from other sources were £55,000. I am bound to quote these figures to consider what would be the grant, and what must be the rate to make up the enormous deficiencies which would result from these two sources—the Exchequer and the ratepayers. I have now stated everything which relates to the educational work of the past year, and I hope that the House will be satisfied that we are really making progress. I may say that the highest grant, taking the schools in their denominations, was made by the Wesleyan schools. There are one or two points with respect to the working of the Act that I should like to say a few words upon. I believe that those great results which I have been able to lay before the House, and which I hope will be still greater, have been the result of compulsion; without it we could never have achieved such results. I am sorry to say that there are still serious obstacles to the future working of that Act. Only this day I had a letter from a School Attendance Committee that less than half the children in the district were not in attendance, and the reason of only half the children being at school was that when the cases were brought before the magistrates the magistrates had resolved not to convict, and these people set the law at defiance. In many instances—and this was most surprising in London—the magistrates seem to think that they were almost above the law, and they do absolutely set the law at defiance in hundreds of cases. It is remarkable when we consider with what general assent both Houses of Parliament passed the Act last year. Both Houses of the Legislature had allowed the Act to make compulsion general throughout the land to pass without the slightest sign of amendment or opposition, and I think it was a very good omen, and it showed the general assent of the Legislature to the compulsory working of the Education Acts. At the time of passing the Act there were about 16½ millions in England and Wales under the bye-laws, and by the 1st January it was required that every union and every local authority should make an application for bye-laws. I am glad to report that on the 31st December last the whole of the unions and local authorities throughout England and Wales, except a small remnant numbering only about 260,000 inhabitants, had applied for bye-laws, and now there was no district throughout the land where those bye-laws have not come fairly into operation. But still there are some things that must be amended if the compulsory system is to be efficiently worked. One is the cost and difficulty of proceeding under the Summary Jurisdiction Act. The cost to the locality of taking out summonses and the difficulties which have been unexpectedly imposed have raised very serious obstacles to the working of compulsory education. I do think that parents who are so neglectful of their duty as those who will not take the trouble to send their children to school, and worse still, those who have come under the operation

of the Industrial Schools Act, should be punished. There were cases recently where the man has neglected his own family and allowed them to run in the streets till they were sent to an Industrial School, and was at the same time getting good wages and keeping another family, and not contributing a farthing. They set the law at defiance, because they had no goods to destrain upon. I do trust that something will be done in order to overcome this difficulty. A great deal has been said about taking out summonses. I am bound so say, from the cases which have come under my notice in the Education Department, that the School Boards make very few mistakes. I have had particulars furnished me of the amount of summonses taken out by the London School Board with a view to enforcing compulsory attendance. There is a periodical published which makes it a subject of censure, and says that the London School Board is very harsh with parents. Under the bye-laws, the well-known 'B' notice, where the parents are admonished for not sending their children to school, there were 79,715 notices sent out last year, and out of that number only 7,722 were summoned, and the number of cases dismissed was only 4. Under section 11—that is, to meet the case of habitual neglect—there were 3,871 summonses, and the cases dismissed were only 11. The employers summoned were 22, and only one case was dismissed. I think that is a fair illustration of the working of compulsion, and this disproves the constant allegations of the hardships undergone by parents at the hands of the School Boards. We are asked what are the moral results of the education on which the country is spending five millions a year. We hear a good deal of declamation against our present system as being irreligious. I am quite sure that neither the noble lords opposite (Sandon and Hamilton), who have presided in the Department, will say that they are irreligious. I know in the town of Liverpool, which the noble lord (Sandon) represents, that both the School Board and the voluntary schools work heartily together, and prizes are given in religious instruction in that town, and the results have astonished some of the opponents of the School Boards when they come to see the answers of the children. The same thing was told him in Manchester of the papers submitted to the School Board, and one who is well known for his opposition to School Boards admits he was taken quite aback by the examination papers, and had no conception of the amount of Biblical knowledge which had been attained by the children in School Board schools. If I wanted to disprove the statement about the decline of religious teaching, I could bring a few facts to the notice of the House. The total number of children in voluntary schools in 1870 was 1,449,000, the total in 1880 was 2,759,000, showing that the numbers receiving very distinct religious instruction in voluntary schools had increased by 811,000 children. Of these, there was an increase in the church schools of 627,000; in the Roman Catholic schools of 79,000; in the British and Wesleyan schools of 127,000; and in the Board schools of 1,085,000, showing a total of 1,900,000, or a total increase of nearly 2,000,000. This total increase of nearly 2,000,000 of children in the schools of the country, and a very large proportion in voluntary schools of the country are, except a small number, receiving religious teaching. Then in Scotland the School Boards adhere to the old system. After that statement who can say that there is no religious teaching given to the children? On the contrary, I think that there never was so much religious teaching given to the children of the country as at this moment, and that it was never so well taught and so well understood as since the Act of 1870 was passed. As to the moral results of the Act, we have abundant evidence of them. I have heard from the Chief Inspector of London Police the wonderful change that he believes to be brought about by the vast number of wretched children taken from the streets. In the town of Birmingham Major Bond says that the effect has been to get rid of the young ruffians who used to stand at the street corners, and whose coarse language and coarse manners caused a scandal in all our large towns. There was a great diminution in that respect and in juvenile crime, and the same thing was reported from all parts of the country. We have been going on during the last ten years making progress towards civilising and humanising those who have been neglected in the past. I should like to say a few words as to the devotion of hundreds and thousands of noble men and women who have taken part in the cause of education. It is extraordinary, and the noble lord opposite (Lord Sandon) will bear me out that in towns like Liverpool, Manchester, Birmingham, and elsewhere, when they take up this work they become absorbed in it, and they devote their lives and their energies and a great deal of their money to it. The voluntary effort brought into the School Board system has astonished me. In Manchester, Liverpool, Birmingham, and elsewhere, we find men and women who are doing honour to themselves and sacrificing their time and means to the educational interests of the rising generation. Having concluded what I have to say in that respect, I proceed now to that part of the statement which refers more immediately to the papers which I have laid on the table. The House will be aware that a year ago, when I made my annual statement, we were somewhat under the censure of the upper House. The subject had scarcely been a month before the country before resolutions were made in the other branch of the Legislature denouncing the Code as ambitious and entirely uncalled for. My noble friend, the Lord President (Earl Spencer), promised the other House of Parliament, and I promised this in my statement, that during the coming year we would make full inquiry into the operations of the Code, and if we found that it was not for the advantage of education, and not calculated to bring out the best possible results for the expenditure and the devotion given to it, that we would come down to the House and frankly state what was the result of our inquiry, and I have now here fulfilled that pledge. I may say that we have had complaints as to the Code from I think everybody who takes an interest in education. The teachers complain that it gives too little freedom to teaching, that it gives unnecessary clerical labour, and that it does not distinguish between good and bad teaching and good and bad schools. That schools that display no skill get as much as those where the work is thoroughly well done. From that time to this we have been receiving suggestions from all quarters, and obtaining evidence to enable us to arrive at a wise solution. I cannot enter upon this subject without speaking of the great assistance we have received, and the ability and zeal shown by the officials in the permanent branch of my Department. Personally, I cannot but express my obligation for what they have done in this matter, and the way in which they have set themselves to accomplish this reform. I should have been unable to make such a statement, or to have laid it on the table in the shape I now place it, had it not been for the intelligence and ability of the permanent staff with which I have been associated. It is due to them that I should acknowledge the assistance they have rendered in getting out the scheme which I have laid on the table. In the first place, we had memorials from School Boards and from persons connected with education who made suggestions for the improvement of the Code. We found ourselves able to agree upon certain principles, and then papers were prepared by twenty or thirty of our principal Inspectors, and we elicited from them the freest possible criticism, and asked them to give suggestions as to the best system which their long experience enabled them to give. Having received those reports, we were enabled to make a draft report, and we agreed further that the matter should be thoroughly sifted and the detail worked out by a committee. The House would like to know the process by which we arrived at that. Sir Francis Sandford, Mr. Sykes, and Mr. Cumin represented the three chiefs of the Education Department; Mr. Warburton, Mr. Sharpe, and Mr. Fitch, the three Inspectors representing the great training colleges—Mr. Warburton for his experience in smaller schools, and Mr. Sharpe for the larger schools. I presided over this committee myself, and Mr. Hodgson acted as secretary, and we had many a long and laborious day's work in arriving at the scheme which we have now submitted to the House. When we had accomplished that, we felt that we must put our work through a finer sieve and must call in additional critics, and we added to the committee Mr. Matthew Arnold, Mr. Moncrieff, Mr. Oakeley, and Mr. Blakiston, and Lord Spencer himself presided over that committee, and the result is

that which I have laid on the table. I must say in laying it upon the table of the House that I do so with great hope and great confidence. But we do not ask, and we shall not ask the House to assent to it as it stands. We simply submit it as the proposals to form the basis of the future Education Code of the country. We ask that it shall receive, not only the fullest criticism, but we hope that it will receive fair consideration. It is not to be made a party question. But we must all assist in the good work. It is not a party question with us. We will take good care that we deal with all schools on an equality—treating them all alike, whether voluntary or Board Schools; and they will come under the same regulations and receive the same grant if they have the same capacity. What we wish to arrive at is sound educational principles, and if we arrive at sound educational principles we can deal with the money payment afterwards. We do not want to go into the question of whether we pay 3d. too much for this or 6d. too much for the other; but what we want to know is what will present the best results and the most thoroughly sound education. I can only say that I trust that during the recess I shall receive suggestions from all parts of the House, and I can promise on behalf of the Department that they shall receive our candid and careful attention. Now I shall submit a few heads of the scheme. Under the first head we deal with the attendance. It is propoosed to adopt the average attendance in each school as the basis of the grants which have hitherto been made on account of individual scholars, whether infants under seven years of age presented to H.M. Inspectors for collective examination or children above seven presented for examination in reading, writing, and arithmetic. The next is that '250 attendances will be no longer required as a condition of examination, but all scholars who have been on the register for six months will, unless there is a reasonable excuse for their absence, have to be presented to the Inspector.' Now with reference to that, I have to say that this is the fairest measure of the work of the school. The grant now depends too much upon chance circumstances and accident over which teachers and managers have no control. For instance, a wet day for inspection, or a snowy day, or the absence of some of the principal children, immediately affects the grant, and the school suffers for one year in consequence of these circumstances. Another reason is that it will keep the work of the school equal. The failure in any part will affect the whole school; and it will tend to make the teachers take an interest in the good and bad scholars alike, and will lead them to take as much interest in the proficient and non-proficient, and in the quick and the dull scholars. The change is in the interest of the children generally. There are constantly cases coming before me of loss to teachers from the causes I have indicated. There was an event which came before me the other day, of a loss arising from the removal of a battery of artillery. These are hardships which are constantly arising; but there is something more serious. We shall remove the temptation to tremendous fraud. It was the most painful part of my duty to have to sit in judgment on teachers who had been tempted to make one or two strokes of the pen which had brought them under the charge of fraud, and the inevitable consequences following, that their certificates are suspended and their characters blasted, and their careers blighted or ruined. I had a case on Saturday last where it only required one single stroke of the pen to complete the number of attendances of one boy. He attended 249 times, and the schoolmaster made that one stroke. What was the difference in that school? That single stroke made £16 difference to that school, because it just brought that boy into the list of boys to be presented. It brought them within the 20 per cent., and it made just £16 difference. We have had cases where two strokes have made £10 and £20, and even £30 and £40 difference to the school; and when the master has done all he can, and the boys fail him at the last moment, I must say that the temptation is very strong to bring up the attendance of the school, and I think that temptation ought to be removed. Abolishing those 250 attendances will remove the strain on the teacher's mind; and it will be the fairest way to obtain payment by results, and I am quite satisfied that it will give great elasticity of teaching and improve the whole system. Now we say under the third clause that grants will be so assessed that the present average rate of aid will, as far as possible, be maintained. The fair school will receive nearly the same grant, the bad school will receive a little less, and the good school a little more; and thus we discriminate between the various schools. Then there will be grants common to all schools. As to music, we propose that the full grant will be paid if the singing is satisfactorily taught from notes, or according to the Tonic Sol-fa system. Only one-half will be paid if the singing is taught by ear. Then there is a sewing schedule which we felt we might make a little lighter for the younger scholars. We felt that it was too much for the younger scholars, and the fancy sewing was not exactly what we wanted. "Clause six is also common to all schools; and this is called the Special Merit Clause. This is a clause which will do more, perhaps, to lift the tide of education than any other in the scheme. 'The Inspector shall have regard to (*a*) the organisation and discipline; (*b*) the employment of intelligent methods of instruction; and (*c*) the general quality of the work in each school, especially in the standard examination; and shall have power to recommend an additional grant on the average attendance, varying in amount according as the school is, in these respects, fair, good, or excellent.' There will be a special merit grant on these three heads. Now, I think the House will say: 'You are placing great powers in the hands of the Inspectors.' Well, I will show how that is proposed to be done when we complete the organisation for inspection, and by it we hope to ensure greater economy, and greater efficiency, and much greater uniformity than hitherto. I now come to infant schools; these also have an average attendance, and where the infants in a school amount to forty, a separate adult teacher will be required for their instruction. For more than sixty infants a certificated teacher will be required. We cannot have infants committed to the charge of monitors or young pupil teachers. We must insist upon better infant school teaching—the foundation of all teaching—and we propose also that part of the grants will be made to depend upon the infants being taught by special methods, something akin to the Kindergarten, giving appropriate and varied occupations; suitable instruction in the rudiments of reading, writing, and arithemetic; and a systematic course of simple lessons on objects (and we want that carried right through the school), and on the phenomena of nature and of common life. Then infants between six and seven may at the discretion of the Inspector be examined individually according to Standard I. of the Code of 1870; and if any scholars in an infant school are taught in Standard I. they will be examined and paid for as in schools for older children. Then we come to boys' and girls' schools. Payments on the passes of individual scholars will be abolished, and 250 attendances will be no longer required as a condition of examination. Then we stipulate that 'all scholars on the register shall be present at the inspection unless there is a reasonable excuse for absence; and all such children who have been six months and upwards on the registers are to be presented for examination.' Then as to the mode of assessing the grant. 'The grant will be calculated on the results of the examination of these scholars. It will be based upon the proportion of passes actually made to those that might have been made by the scholars examined.' I cannot claim credit for this invention; it is one of the simplest, and it saves an immense amount of labour. Let me explain it. It states the proportion of passes actually made to those that might have been made. Now, supposing you had 100 children, the maximum they might make would be 300 passes; supposing they make 270 passes, that is ninety per cent., and supposing they make 240 passes, that is eighty per cent., they will be paid for thus:—10s. when they make 100 passes per cent., then 9s., and 8s. when they made ninety and eighty passes per cent. But the House will see that there will be no longer that temptation to push forward children who can make a certain percentage; it will be based upon the work of the school and upon the special merits of the school, and I believe in that respect we may expect a vast improvement and get better results out of the teaching. In Standards I. and II. we propose, unless either of them is a standard for half-time labour, that instead of examining every child—and there are three or four milions of children scheduled

in the Education Department—instead of examining them individually, the Inspectors will examine such a number of scholars as will enable them to estimate the quality of the instruction in each of the three elementary subjects. The Inspector may take ten, twenty, or thirty children just as he pleases. When you get to Standard III., where the passes are important, and where the parents like to know how their children are getting on, then for the present at least all scholars presented in Standard III. and upwards will be examined. More than one million and a quarter of the children are examined in Standards I. and II., and the examination of those little children under seven years of age in the very simplest elements imposes upon the Inspectors an amount of labour perfectly unnecessary, and this amount of drudgery we propose to relieve the Inspectors of. Well, then, we propose to add a Seventh Standard. We had six standards, but what was the result? In many a rural school, when a boy has passed the Sixth Standard, and wants to stay a little longer, the teachers are anxious to get rid of him. I have complaints saying, 'My boy has passed the Sixth Standard, and I want to keep him at school, and they say that they cannot keep him unless they double his fee, because he does not earn a grant.' We believe now that we must have seven standards. We say that if any scholar, over ten years of age, is, after the 1st April, 1883, presented in the First or Second Standard, the passes made by such scholar will not be reckoned in calculating the percentage of passes for the purpose of a grant. Then I come to a very difficult question—the question of class subjects. I have satisfied myself that specific subjects in the Fourth Standard lead almost entirely to cram. They are simply used for the purpose of getting a grant, and we have little physiologists and little geologists of nine or ten years of age who get up some technical words which they do not understand, and that has done very much to the neglect of thoroughness in other subjects. Now there are some things that children should know, some common facts that children ought to be made acquainted with. I want the House to bear in mind we have to work and take the condition of the labour market into consideration, and the state of the Acts, and the fact that the majority of our passes are in the Fourth Standard, and the children who pass the Fourth Standard we want to learn something more. There are some things that they ought to learn, and they ought to have some standard work, and acquire a knowledge of certain specific subjects in addition. I think it is better to remove the specific subjects to the Fifth Standard. The school will be regarded as made up of two divisions—in the lower division, Standards I. to IV.; and in the upper, Standard V. and upwards. Two class subjects may be taken in each division. English will be taken as a class subject—that is to say, grammar and recitation. A boy ought to know something of his own language and something of the poetry and literature of his own language, and we insist that it shall not be the commonplace stuff that is to be found in the school-books; but we propose that they shall learn good English, and get them to learn a hundred lines of Milton or a hundred lines of Shakespeare; and instead of taking a fourth or fifth-rate obscure poet, we intend them to read Milton and Shakespeare in the Fifth, Sixth, and Seventh Standards. We say that geography, including physical geography—in fact, the two subjects must be taught together. Mr. Fearon, who represents the physical geography, has a proposition. He proposes that in the First Standard they shall know the meaning and use of the map. A plan of the school and the playground will be given, and he desires that they shall know the four cardinal points. Then they shall go on to the size and shape of the world, geographical terms will be explained and illustrated by reference to the map of England, and physical geography with reference to rivers; and so on. What they do learn they shall learn not merely from books. My learned friend the member for the University of Dublin said that he never meant that they should be taught merely from reading-books, but that they should have illustrations. We propose that they shall have illustrations. Then we pass on to what we call elementary science. English (grammar and recitation), geography (including physical geography) and elementary science, will alone be recognised as class subjects in the lower division, and if only one class subject is taken in the lower division it shall be English; if two are taken the second shall be geography or elementary science. The upper division may take as class subjects any of the three subjects to which the lower division is restricted, or history, or a specific subject, treated and examined in as a class subject. The grant for class subjects will be made, as now, on the average attendance, and an increased grant will be paid if 20 per cent. of the scholars examined are presented in Standard IV. and upwards. We propose that one of the reading-books in each standard must be an historical reading-book, adapted to the ages of the scholars in the standard. Now I do not know why children who read something should not have historical reading-books, so that a child may know something of the history of his own country. Then there are specific subjects. We say that no scholars shall be examined in specific subjects if the percentage of actual to possible passes in the elementary subjects of the previous inspection was less than 75—that is, unless 75 per cent. of them pass in standards; we say that they shall not take up specific subjects until they have done this. I now pass on to the night schools. They are thoroughly on the decrease. Their decline is something like from 70,000 or 80,000 to 40,000 in this year. The teaching of merely the three R's in the night school has ceased to be attractive. Children are taught them in the day school, and then the condition of boys who have been presented in a higher standard in the day school has gone a long way to ruin the night schools, and I think our night schools may be said to be in a most miserably declining condition. Now we propose to do this. We are anxious that a boy whose short school life in the Fourth Standard ended at ten or eleven years of age may have some chance of carrying on his education during the evening. We do not propose to make his attendance compulsory; a boy who has worked eight or ten hours cannot be compelled, he must be attracted. We have laid down three simple clauses for the night schools. 'Grants will be no longer confined to reading, writing, and arithmetic, but will be made also for proficiency in class subjects.' As something more than reading and writing will be taught hereafter in the night schools, grants will be paid in respect of those children only who, having passed the standard fixed by the bye-laws of their district for total exemption, are under no obligation to attend school and are not day scholars. That is to say, a boy who has passed his full time standard, and leaves the day school before he can receive the grant, may attend a night school. There is another clause which I hope the House will agree to—it is that a teacher in a night school need not be a layman. I know that the Nonconformist ministers may help the teachers of the night schools, whose burden is heavy enough. Often in the rural districts the only intelligent person who can assist the schoolmaster might be the Nonconformist minister, and I ask that he shall be allowed to assist the schoolmaster. At present we allow none but laymen to teach in the day schools, and I see no reason why a Christian brother, or a local preacher, should not assist at a night school. I see no reason why a clergyman who wishes to be useful cannot be allowed to assist in a night school. But if there is any blame or any merit due to that suggestion it is due to me. I am prepared to take the full share of discredit, if any, for that suggestion. I know from my experience in my earlier youth that all the knowledge of natural history I obtained was at a night school taught by a clergyman, who at the same time taught a friend of mine, now one of the greatest naturalists living, and the secretary of the Royal Geographical Society—Dr. Bates. At the last meeting of the British Association at Sheffield, there were several clergymen who desired to teach botany to children, and those men found that they were excluded from the schools, and they had to take the children to their own houses to give them lessons. I think that the House will not misinterpret my desire to utilise all those forces. Special grants to pupil teachers will be continued. Not more than three pupil teachers will be allowed in any school or department, whatever number of certificated teachers may be employed. The number of pupil teachers to be employed as teachers are now in excess considerably, and there will be some 76,000 school teachers without hope

of employment when they have finished their apprenticeship. We also abolish the stipendiary monitors. They have not been a success. Candidates for apprenticeship as pupil teachers will be required to pass Standards V. and VI. Then, as to the staff in the school, an assistant teacher will count as sufficient for sixty scholars instead of eighty, as heretofore; and no teacher examined at or after Christmas, 1882, will be allowed to have pupil teachers who has not passed in papers of the second year. We wish to raise the *status* and qualification of the teacher. We are closing a side-door by which incompetent persons enter the profession, and I shall tell you how we intend to open another door. By clause 38 we make a fair and right concession to the schoolmaster. The annual entries made by inspectors on teachers' certificates will be discontinued after they have been raised to the first class. We often have complaints that a young inspector will endorse the certificate of an old teacher in a way very disheartening to the teacher in his work. If a man has once attained his first class, he can always get from the Department a record of his services, and he will be entitled to claim from the managers of his school a certified copy of the inspector's yearly report when it is entered in the log book. We propose to open another avenue to the teaching profession. In my experience in the Education Department I have applications by the dozen—almost by the hundred—from university men who want some occupation. We are multiplying very largely the number of men who attend the university. All our grammar schools have scholarships. That bridges the gulf between elementary schools and the universities. In the town of Birmingham the system is so complete that you have a perfect network of elementary schools. Then you have the higher schools for those who have to pass out in the fourteenth or fifteenth year; and, further, you have your middle-class scholarships founded by King Edward's foundation. The same thing takes place in Manchester, Liverpool, and Nottingham, and if we can only get the endowments of the country applicable to their proper objects, if we can only get the endowments dealt with with any degree of rapidity, we shall have a complete system of middle-class education which will meet the wants of, and give a stimulus to, the elementary schools. This brings, moreover, more men to the universities. A man going to the university in Scotland carried his university teaching into business; but in England a man who had been at the university thought he must be a professional man, or a servant of the Government, or have some employment that is not in the ordinary line of common employment. We propose to open the doors to those who come from the university, and to make them teachers. We say that graduates of any university in the United Kingdom, and women who have passed certain of the higher examinations held by the universities, may be recognised as assistant teachers, and will be admissible to examination for certificates after serving as assistants for one year in a school under inspection, if the inspector reports favourably of their skill in teaching and reading, and in the case of women, of needlework. We require them to come to work for a year, and offer them a fair field, and it will be a field through which they will pass to the schools. It will bring up the whole profession, and raise the tone of the teachers of the elementary schools by the qualifications which these teachers will possess. I am now about to conclude. Certificates will be no longer granted without examination; and no certificate will be cancelled, suspended, or reduced until the Department has informed the teacher of the charges against him, and has given him an opportunity of explanation. Now I have two questions about which my noble friend, Lord Sandon, has some difficulty, and as to which I know that whatever merit there is in them is due to my noble friend; but I believe they were made to meet a state of things that is now passing away. The payment of honour certificates will be discontinued. The noble lord thought the honour system stimulated the attendance of children, and that it was one of the means of indirect compulsion. He expected that it would be largely availed of, and it was thought there would be a payment of £50,000 a year; instead of which, owing to the objection that it was always to be a reward in the future, and that it was prospective and not retrospective, the honour certificate has caused a great deal of heartburning and a great deal of difficulty, and I know of nothing that has caused so much trouble to the Department. A person feels that the child at the end of the year, if he does not receive his payment back, is in some little difficulty, and that it is a wrong done to the children. Now there is no need of this stimulus any longer, and I think it can be better employed in bringing them into the night school than in spending £50,000 a year, which goes mainly to the children of the lower middle-class. Then there is another question: The production of a child's school-book will no longer be required as a condition of the payment of annual grants. Now the school-book was meant to keep a record of the age and attainments of the child, so that it might be a record for all purposes, whether as a record for labour, or on passing from school to school. I was very sanguine myself, and I know I spoke very strongly on this, and I am bound to say that nearly all over the country it is a complete failure. In a town like Birmingham not 2 per cent. of the school-books have been used. Some of the children have three and four, and as many as eleven school-books, and I find a statement here where a child has been found with three school-books with a different age in each school-book, that each of the ages was a wrong one, and the factory inspectors refused to accept the school-book as the real proof of the child's age. Therefore the child's school-book must go, and we no longer make the production of the school-book necessary. I am almost ashamed to look at the clock. I have only one more topic to speak upon, and I have no doubt I will be asked what are we going to do with the system of inspection, for if we are going to give special money grants to schools, how are you going to deal with individual inspectors who make grants on mere caprice? Well now, our system of inspection is somewhat overgrown. The whole Department has grown up so rapidly, and inspection of every individual student has been considered so important, that we have a large number of inspectors—120 or 130—and an equal number of inspectors' assistants, and if we continue to examine them we must increase this staff every year. We have complaints from various parts of the country as to the laxity in some cases and the want of indulgence in others, and these complaints cause a great deal of trouble and anxiety. What we propose to do is to divide England and Wales into districts. We shall take from amongst our very best and most trusted inspectors a certain number of men to be inspectors of those districts, and we shall place them at the head of those districts. Under those inspectors there will be other inspectors, who will be subordinate in the district, and with that inspector they will have to communicate, and he will be held responsible for their work. We propose by that to diminish the higher grade of inspectors, and to call into existence another class of inspectors. We have no freedom. Some of our ablest and best inspectors' assistants, who have taken university degrees, men of high character and ability, who have spent a dozen years in the service of the Department, cannot earn any considerable addition to their salary, and, after doing good service, perhaps only receive £175 per annum. We propose to get an inspector between the inspector and the inspector's assistant, and we propose to have sub-inspectors recruited from the ranks of the inspectors' assistants and from the ranks of the schoolmasters. The salaries of those sub-inspectors would have to be fixed by the Treasury, but they would only be called into existence as sort of supernumeraries when others retire or drop off; but we propose that the chief inspectors of the Department—and there are twelve or fifteen of them—shall once a year meet at Whitehall, and lay down a regular system of examination for their respective districts. They shall agree upon a plan and upon their tests as to good, fair, and excellent, and shall then enforce that uniformity upon the inspectors below them. We hope by this means to achieve much more uniformity throughout the country. I do not intend that any inspector shall be employed who has not had ample preparation and experience in the schools, but we do intend that there shall be some test exacted from inspectors as to their capacity to inspect, and as to their ability to descend to child-life. I must apologise to the House; and although my statement must be rather dry, I feel that the Department with which I am connected is as much associated with the honour and the greatness of England as our army and navy.

Pupil Teacher's Examination Questions.

JULY, 1881.

CANDIDATES.

Three hours and a-half allowed.

Arithmetic.

MALES.

1. Find the cost of 15,378 articles at 16s. 7½d. each.
2. 13¼ tons at £3 17s. 10½d. per cwt.
3. How many lbs. of coffee at 2s. 3d. per lb. are equal in value to 255 lbs. of tea at 4s. 9½d. per lb.?
4. If 1 cwt. of sugar costs £2 16s. 6d., what will 1 ton 17 cwt. 1 qr. cost?

FEMALES.

1. Make out the following bill:—
   189 yds. of cloth at 15s. 6d. per yard.
   14¼ ,, diaper at 1s. 7d. ,,
   64 ,, muslin at 12s. 6d. ,,
   72 ,, cambric at 5s. 6d. ,,
   14 hats at 12s. 6d. each.
   19 umbrellas at 18s. 7½d. each.
2. What will be the cost of 14,865 articles at 13s. 6½d.?
3. Find the value of 16 yds. 2 ft. 10 in. at 2s. 6½d. per yard.
4. Find the cost of 70,014¼ articles at £1 13s. 8d. each.

Grammar.

1. 'The building rook will caw from the windy tall elm-tree,
   And the tufted plover pipe along the fallow lea,
   And the swallow will come back again with summer, o'er the wave;
   But I shall be alone, mother, within the mouldering grave.'
   (*a*) Point out and parse the verbs and adjectives in the above.
2. How many kinds of adjectives are there? Give two examples of each.
3. What is the difference between adjectives and adverbs?

Geography.

1. What names are given in the British Islands to points of land projecting into the sea? Give examples of the use of each term, and *(if you can)* draw little sketch maps as illustrations.
2. Describe as fully as you can the position of the chief heights in the *Cumbrian group*, and the lakes connected with them.
3. What are the chief objects of interest which a visitor to Ireland ought to see? Give the position of each, and describe *one* of them fully.

Composition.

Write from dictation the passage given out by the Inspector.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word *Elementary*.

Write, in small hand, as a specimen of copy-setting, '*Example and practice are more efficient than precept and theory.*'

Write the following passage from Dictation.

The sun was going down | in a clear sky; | and when, | turning from the dazzling western sea, | the eye wandered eastwards, | the view was such | as could not but transport | a heart at ease. | The tide was low, | and long shadows | from the rocks | lay upon the yellow sands, | and darkened, | near the shore, | the translucent sea. | At the entrance of the black caverns, | the spray leaped up | on the advance of every wave, | not threatening, | but as if at play. | Far away | over the lilac and green waters | rose craggy peaks, | whose projections and hollows | lay in the softest light and shadow.

CANDIDATES.—ANSWERS.

Arithmetic.

MALES.

1.

£	s.	d.	
15378	0	0	= value at £1 0s. 0d.
2563	0	0	= ,, 3s. 4d.
16	0	4½	= ,, ½d.
2579	0	4½	= ,, 3s. 4½d.

3s. 4d. = ⅓ of £1
½d. = $\frac{1}{120}$ of 3s. 4d.

∴ the value of 15378 at 16s. 7½d. = 12798 19 7½ Ans.

2. 13¼ tons = 265 cwt.

(*a*) 265 cwt. at £4 =

£	s.	d.
1060	0	0

(*b*)

£	s.	d.	
265 ,,	2s. = 26	10	0
265 ,,	1½d. = 1	13	1½
265 cwts. at £3 17s. 10½d. =	28	3	1½

1031 16 10½ Ans.

3. 2s. 3d. : 4s. 9½d. :: 255 lbs. :

255 lbs. × $\frac{27}{114}$ = $\frac{85 \times 77}{12}$ lbs. = 545$\frac{5}{12}$ lbs. Ans.

4. 1 ton 17 cwt. 1 qr. = 37½ cwt.

£	s.	d.		£	s.	d.
37	5	0				
		2				
74	10	0	= value of 37½ cwt. at 2	0	0	
18	12	6	= ,, ,,		10	0
9	6	3	= ,, ,,		5	0
2	6	6½	= ,, ,,		1	3
	9	3¾	= ,, ,,			3
105	4	7½	= ,, ,,	2	16	6

10s. = £½
5s. = ½ of 10s.
1s. 3d. = ¼ of 5s.
3d. = ⅓ of 1s. 3d.

FEMALES.

1.

		£	s.	d.
189 yds.	at 15s. 6d. per yd. =	146	9	6
14¼ ,,	,, 1s. 7d. ,, =	1	2	11½
64 ,,	,, 12s. 6d. ,, =	40	0	0
72 ,,	,, 5s. 6d. ,, =	19	16	0
14 hats	,, 12s. 6d. each =	8	15	0
19 umbrellas	,, 18s. 7½d. ,, =	17	13	10½
	Total =	233	17	4 Ans.

2.

£	s.	d.		s.	d.
14865	0	0			
7432	10	0	= value of 14865 at	10	0
2477	10	0	= ,, ,, ,,	3	4
154	16	10½	= ,, ,, ,,		2½
10064	16	10½		13	6½

10s. = £½
3s. 4d. = ⅓ of 10s.
2½d. = $\frac{1}{120}$ of 3s. 4d.

3.

£	s.	d.		
0	2	6½		
		17		
2	3	2½	value of 17 yds.	
	1	1½	,, 2 in.	
2	3	0½	,, 16 yds. 2 ft. 10 in.	Ans.

2 in. = $\frac{1}{18}$ of 1 yd.

4.

£	s.	d.		£	s.	d.
70014	7	6	= value of 70014¼ at	1	0	0
35007	3	9	= ,, ,,		10	0
11669	1	3	= ,, ,,		3	4
1166	18	1½	= ,, ,,			4
117857	10	7½	= ,, ,,	1	13	8

10s. 0d. = £½
3s. 4d. = ⅓ of 10s.
4d. = $\frac{1}{60}$ of 3s. 4d.

Grammar.

1. *building*—verbal adj., qual. *rook*.
   will caw—intrans. reg. verb, indic. mood, fut. indef. tense, 3rd pers. sing., agree with *rook*.
   windy—adj., qual. *tree*.
   tall—adj., qual. *tree*.
   tufted—distinguishing adj., qual. *plover*.
   (*will*) *pipe*—intrans. reg. verb, indic. mood, fut. indef. tense, 3rd pers. sing., agree. with *plover*.
   fallow—adj., qual. *lea*.
   will come—intrans. irreg. verb, *come, came, come*; indic. mood, fut. indef. tense, 3rd pers. sing., agree with *swallow*.
   shall be—subst. verb, *am, was, been*, indic. mood, fut. indef. tense, 1st pers. sing., agree. with *I*.
   alone—predicative adj., qual. *I*.
   mouldering—verbal adj., qual. *grave*.

2. The kinds of adjectives are—1. *Qualifying*, as, *virtuous, beautiful.* 2. *Quantifying*, as, *one, thirty.* 3. *Demonstrative*, as, *this, yon.*

3. *Things* belonging to the same group are distinguished from each other by certain qualities or attributes, which are denoted by *adjectives.* In like manner, different instances of an action or attribute are distinguished from each other as regards *time, place, manner, degree*, by the *adverb.*

Geography.

1. The names given to projecting points of land in Great Britain and Ireland are :—

Cape—Cape Wrath, north-western extremity of Caithness, a lofty pyramidal rock.
Head—Duncansby Head, north-eastern extremity of Caithness.
Mull—Mull of Cantire, south of Argyleshire, a narrow peninsula 50 miles long.
Ness—Buchan Ness, in Aberdeenshire, a rocky headland 33 feet above the sea.
Point—Ardnamurchan Point, most westerly part of the mainland of Britain, the end of a long tongue of land.
Butt—Butt of Lewis, a tapering point, the extremity of the island.
Foreland—North and South Foreland, the termination of the Downs.
End—Land's End, an abrupt mass of granite rock in the south-west of Cornwall.
Bill—Portland Bill, south of Dorset, a long spur of rocks striking out westwards.
Ord—Ord of Caithness, rises on the east of the county from the shore with a sharp ascent of 700 feet.

Peculiar { *Naze*—The Naze, in the east of Essex. *Needles*—The Needles, eastern point of the Isle of Wight.

2. The centre of the Cumbrian group is marked by *Helvellyn*, 3,000 ft. high; the northern borders by *Skiddaw*, the great western heights by *Scafell*, the loftiest mountain in England, 3,162 ft., and by *Bowfell*, lying near it. To the south is *Coniston Old Man*, whence the hills gradually fall to the sea in the peninsula of Furness.

The chief peculiarity of the English lakes is that those of any consequence lie embosomed in the narrow valleys which are ranged round Helvellyn, the centre of the Cumbrian Group, and radiate outwards in all directions. The largest are *Windermere, Haweswater, Ullswater, Thirlemere, Derwentwater, Bassenthwaite Water, Buttermere, Crummock Water, Ennerdale Water, Wastwater*, and *Coniston Water.*

3. The chief objects of interest to one visiting Ireland are—*Connemara*, a peninsula in the W. of Galway, *Lough Neagh*, and the *round tower* of Antrim—the round towers of Ireland have long puzzled antiquarians; *Giant's Causeway*, near Bengore Hd., in N. of Antrim, consisting of 40,000 basaltic columns stretching into the sea; *Bog of Allen* (250,000 acres of morass), occupying Kildare, King's Co., Meath, and Roscommon; *St. Patrick's Purgatory*, a place sacred to R. C.'s, in L. Derg, in Donegal; *Lakes of Killarney*, consisting of an Upper, a Middle, and a Lower Lake, with magnificent scenery; *Lake of Serpents*, in the vale of Glendalough, amid the Mts. of Wicklow; *Curragh* of Kildare; *Castle Blarney*, near Cork; the Marble Quarries of Kilkenny, etc.

FIRST YEAR.

Pupil Teachers at end of First Year.

Three hours and a-half allowed.

Arithmetic.

MALES.

1. If 2¼ cwt. cost £46½, what is the cost of 13½ lbs.?
2. Reduce ⅞ of 17s. 3½d. to the decimal of £1, 3s. 1½d.
3. Find the value of 2·86805 of 3s. 0d., + ·83 of 4s. 0d. + 1·8 of 5s. 0d., and subtract the sum of the whole from one guinea.
4. Add $\frac{3}{11}$ of 1s. 6d. to $\frac{7}{9}\frac{3}{11}$ of $\left\{\frac{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{7}{24}}{2}\right\}$ of £1, and subtract their sum from $\frac{7}{11}$ of 12s. 6d.

FEMALES.

1. A field of 12 acres having 120 stalks to each square yard, and 70 grains to each stalk, produces wheat to the value of £96, 16s.; what will be the worth of the produce of 800 sq. yds., having 175 stalks to the sq. yd., and 45 grains to each stalk?

2. If I pay 1s. 3d. for 6 lb. 14 oz. of bread, when wheat is 4s. 9d. per bushel; what must I pay for 23 lb. 12 oz. when wheat is 5s. 5d. per bushel?

3. I spend 12 guineas in 35 days, and save £100 a year; what must I earn in the year?

4. An income of £3,827, 12s. 6d. is taxed at the rate of sevenpence in the pound; how much clear income will remain?

Grammar.

1. Parse the pronouns in the following :—

What dwelling shall receive me? In what vale shall be my harbour? Underneath what grove shall I take up my home? and what clear stream shall with its murmur lull me into rest?—WORDSWORTH.

2. How can you prove, in the following examples, that the relative agrees with the antecedent *in person*?

(*a*) 'Thou, O spirit, that dost prefer.'
(*b*) 'I that speak in righteousness.'

3. The following words—*save, except, but*—are sometimes used as prepositions, sometimes as conjunctions :—How can you tell when they are prepositions? Give examples of their use as such.

Geography.

Answer *either* Q. 1 *or* Q. 3, *not both.*

1. What are the chief objects of interest which a visitor to Ireland ought to see? Give the position of each, and describe *one* of them fully.

2. Draw a map, showing the coast-line of France, from the Pyrenees to the frontier of Belgium, and the courses of the three great rivers which flow into the Bay of Biscay and the English Channel, with their tributaries.

3. Name the seaports of Russia, and describe the advantages and disadvantages of each.

History.

1. Write out a list of our sovereigns from Alfred to Harold II., with dates.

2. Give the names and dates of sovereigns who filled the English throne in the sixteenth century.

3. What sovereigns have reigned in England since 1700? Give their dates.

Penmanship.

Write in large hand, as a specimen of copy-setting, the word *Elementary.*

Write, in small hand, as a specimen of copy-setting, '*Example and practice are more efficient than precept and theory.*'

Composition.

Write from memory the substance of the passage read to you by the Inspector.

ANSWERS.—FIRST YEAR.

Arithmetic.

MALES.

1. 2¼ cwt. : 13½ lbs. :: £46½ : *x*.

$$£\frac{2\frac{1}{4}\frac{1}{1} \times \frac{105 \text{ lbs.}}{252 \times 8}}{} = £\frac{77}{8\times 4} = £2\ 8s.\ 1\tfrac{1}{4}d.\quad \text{Ans.}$$

2. $\frac{\frac{7}{8} \text{ of } 17s.\ 3\frac{1}{2}d.}{£1\ 3s.\ 1\frac{1}{2}d.} = \frac{\frac{7}{8} \text{ of } 207\frac{1}{2}d.}{277\frac{1}{2}d.} = \frac{5\times 829}{7\times 1110} = \frac{829}{1554} =$ ·5334620. Ans.

3. 2·86805 of 3s. = 8·604165s.
·83 of 4s. = 3·333333
1·8 of 5s. = 9·
20·9375

21s. − 20·9375s. = ·0625s. = ¼d. Ans.

4. (*a*) $\frac{3}{15}$ of 1s. 6d. = 10½d. = 0 10½

(*b*) $\left\{\frac{\frac{1}{2}+\frac{1}{3}+\frac{1}{4}+\frac{7}{12}}{2}\right\}$ of £1 = $\frac{8+6+3+7}{48}$ of £1 =

$\frac{1}{2}$ of £1; and $\frac{7}{10}\frac{3}{0}$ of 10s. = 0 9½

Sum of (*a*) and (*b*) = 1 7½

(*c*) $\frac{3}{15}$ of 12s. 6d. = 1 8

Subtracting 1 7½

Diff. = 0 0½ Ans.

FEMALES.

58080 sq. yds. : 800 sq. yds.
120 stalks : 175 stalks
70 grains : 45 grains
:: £96 16s. : *x*.

$\frac{1936s. \times 800 \times 175 \times 45}{58080 \times 120 \times 70}$ = £25. Ans.

2. 6 lbs. 14 oz. : 23 lbs. 12 oz.
4s. 9d. : 5s. 5d.
:: 1s. 3d. : *x*.

$\frac{15d. \times 380 \times 65}{110 \times 57}$ = $\frac{4}{11}\frac{0}{0}$d. = 59$\frac{1}{11}$d. = 4s. 11$\frac{1}{11}$d. Ans.

3. $\frac{£12\ 12s. \times 365}{35}$ = £1 16s. × 73 = £131 8s.

he saves 100 0

∴ total yearly earning = 231 8s.

4. £3827½ @ 7d. per £.

7

12)26793½d.

2,0)223, 2s. 9½d.

£3827 12s. 6d. − £111 12s. 9½d = £3715 19s. 8½d. Ans.

Grammar.

1. *me*—1st pers. pron. masc. (?) sing. obj. gov. by *shall receive*.
my—pron. poss. adj., qual. *harbour*.
I—1st pers. pron. masc. sing. nom. subj. of *take*.
its—pron. poss. adj. qual. *murmur*.
me—1st pers. pron. mas. sing. obj. by *lull*.

2. That the relative *that* (a) agrees with its antecedent *thou* is proved by its taking the inflection of the verb (*dost*) required for *thou*, and (b) taking the form *speak*, just as if *I* was standing in place of *that*.

3. *Save*, *except*, and *but*, should be parsed as prepositions when they are followed by a noun or pronoun, which is not the subject of a verb; as, 'All perished save *we*,' '. . . . . all *but* the nightingale.'

Geography.

1. *See same question answered under Candidates' paper in this number of Magazine.*

3. The seaports of Russia are—*Archangel*, at the mouth of the North Dwina, exports corn, hemp, flax, and timber, but locked by ice for half the year. *St. Petersburg*, on the Neva, with a very extensive foreign trade in tallow, hemp, flax, etc. Owing to the shallowness of the Gulf of Finland most vessels unload at *Cronstadt*, a great fortress and naval port. *Riga*, the third port in Russia, exports the usual Russian products, but the Gulf is much impeded by sandbanks. *Odessa*, on the Black Sea, the grand emporium of S. Russia, has rapidly risen to be the second commercial city in the empire. *Taganrog*, on the sea of Azov, is frozen from December to March, but when open the bustle is immense. *Astrakhan*, the chief emporium of the trade of the Caspian Sea, and chief seat of the important fisheries of the Caspian and the river Volga. *Baku* is also rising in importance.

History.

			A.D.
1. Alfred	began	to reign	871
Edward the Elder	,,	,,	901
Athelstan	,,	,,	925
Edmund I.	,,	,,	941
Edred	,,	,,	946
Edwy	,,	,,	955
Edgar	,,	,,	959
Edward the Martyr	,,	,,	975
Ethelred II., the Unready	,,	,,	978
Edmund II., Ironside	began	to reign	1017
Canute	,,	,,	1017
Harold	,,	,,	1036
Hardicanute	,,	,,	1039
Edward (Confessor)	,,	,,	1041
Harold II.	,,	,,	1066

2. The sovereigns of the sixteenth century were:—

			A.D.
Henry VII., died			1509
Henry VIII., began	to	reign	1509
Edward VI.	,,	,,	1547
Mary	,,	,,	1553
Elizabeth	,,	,,	1558-1603

3. The sovereigns who have reigned in England since 1700 are:—

			A.D.
William III., who died			1702
Anne	began	to reign	1702
George I.	,,	,,	1714
George II.	,,	,,	1727
George III.	,,	,,	1760
George IV.	,,	,,	1820
William IV.	,,	,,	1830
Victoria	,,	,,	1837

SECOND YEAR.

Pupil Teachers at end of Second Year.

Three hours and a-half allowed.

Arithmetic.

MALES.

1. Find the simple interest on £500 for four years at £5, 7s. 6d. per cent. per annum; and the amount of £2,000 for 12½ yrs. at 3½ per cent. per annum.

2. What amount of capital, put out at 3½ per cent. per annum, simple interest, would produce £14 interest in 4⅘ years?

3. A farmer, having 37½ score of sheep, sold 8 per cent. of them to A, 90 sheep to B, and 3½ per cent. of the remainder to C. How many sheep had he then left?

4. A woman bought oranges at the rate of 8 for 5d., and sold them so as to gain 1½d. on each dozen. (1) What did she charge for each orange? (2) What did she gain per cent.?

FEMALES.

1. Find the sum of ⅛, 3½½, 10¾, and $\frac{9}{16}$.

2. Reduce $\frac{3\frac{1}{8}}{1\frac{1}{12}}$ of $\left\{\frac{1}{11}\frac{3}{2}\text{ of }£1 - \frac{17}{16}\text{ of }1s.\right\}$ to the fraction of a moidore (a moidore = 27s.)

3. Of a field, ⅓ is meadow, ⅔ is arable, and the remainder is 1 ac. 3 ro. 26 po. Find the quantities of meadow and arable land.

Grammar.

1. 'The pass was left; for then they wind
Along a wide and level green,
Where neither tree nor tuft was seen.'—SCOTT.

(*a*) Show, from the above passage, that conjunctions may join both principal to principal sentences, and subordinate to principal sentences.

(*b*) Parse the participles in the above, and show how participles differ from verbs.

2. In analysis an enlargement is said always to be an adjective, or to partake of the nature of an adjective. If this is so, what parts of a sentence are (properly speaking) capable of enlargement? Give examples of such enlargements.

Geography.

Answer *either* Q. 1 *or* Q. 3, *not both*.

1. What are the chief objects of interest which a visitor to Ireland ought to see? Give the position of each, and describe *one* of them fully.

2. Draw a map, or little sketch-maps, showing the position of Calcutta, British Burmah, Singapore, Labuan, and Hong-kong.

3. Say what you know about the history and character of the British settlements in Africa.

One hour allowed for Females, two hours and a half for Males.

History.

1. Mention the most illustrious of our Saxon and Norman kings, and give briefly your reason for selecting them.

2. Sketch the career of Henry III., and mention any great statesmen who directed the Government in his reign.

3. Give some account of (*a*) Danegelt; and (*b*) Magna Charta.

Penmanship.

Write, in large hand, as a specimen of copy-setting, the word *Elementary*.

Write, in small hand, as a specimen of copy-setting, '*Example and practice are more efficient than precept and theory.*'

Composition.

Write full notes of a lesson on *Ships of war*.

Euclid.

[All generally understood abbreviations for *words* may be used, but no symbols of *operation*, such as —, +, ×, are admissible.]

1. Of what different parts does every proposition consist? What is the *reductio ad absurdum*?

If two triangles have two sides of the one equal to two sides of the other, each to each, and have likewise the angles contained by those sides equal to each other; they shall likewise have their bases or third sides equal, and the two triangles shall be equal, and their other angles shall be equal each to each—viz., those to which the equal sides are opposite.

2. To make a triangle of which the sides shall be equal to three given straight lines, but any two whatever of these must be greater than the third.

ANSWERS.—SECOND YEAR.

Arithmetic.

MALES.

1. (*a*) Interest of £500 for 4 years at 5½ p. c.

$$= £500 \times \frac{4 \times 43}{800} = £\frac{5 \times 43}{2} = £107\ 10s. \quad \text{Ans.}$$

(*b*) Interest of £2000 for 12¼ years at 3½ p. c.

$$= £2000 \times \tfrac{49}{4} \times \tfrac{7}{200} = £\frac{20 \times 49 \times 7}{8} = £857\ 10s.$$

$\therefore$ Amount = £2857 10s. Ans.

2. £3½ : £14 } :: £100 : x.
4¾ yrs. : 1 yr. }

$$£100 \times \tfrac{3}{2} \times \tfrac{4}{19} = £\tfrac{150}{19} = £84\ 4s.\ 2\tfrac{2}{19}d. \quad \text{Ans.}$$

3. 37½ score = 750
8 p. c. of 750 = $750 \times \frac{8}{100} = 60$ No. sold to A.
After selling 90 more he has 750 − 150 or 600 left.
3½ p. c. of 600 = $600 \times \frac{7}{200}$ or 21; and $\therefore$ the rem. = 600 − 21 or 579. Ans.

4. (*a*) 8 oranges cost 5d.
$\therefore$ 1 " " ⅝d.
and 12 " " 7½d.
7½d. and 1½d. = 9d the selling price of 12.
$\therefore$ the selling price of 1 = ¾d. Ans.

(*b*) The gain on ⅝d. = ⅛d. − ⅝d. or ⅛, *i.e.*, ⅛ of the whole, or $\frac{1}{8} \times \frac{8}{1}$ which is 20 p. c. Ans.

FEMALES.

1. $\frac{1}{8} + 3\frac{11}{11} + 10\frac{3}{5} + \frac{3}{11} = 13 + \frac{495 + 1232 + 528 + 540}{1320} = 15\frac{1795}{1320}$
$= 15\frac{359}{264}$. Ans.

2. $\frac{5}{8} \times \frac{11}{12}$ of $\frac{152 - 7}{48}$s. to the fraction of 27s.

$$\tfrac{145}{48}s. \times \tfrac{5}{8} \div 27 = \frac{145 \times 26}{48 \times 9 \times 27} = \tfrac{1885}{11664}. \quad \text{Ans.}$$

3. $\frac{1}{3} + \frac{1}{8} = \frac{8 + 15}{40} = \frac{23}{40}$
$\therefore \frac{17}{40}$ = rem. = 1 ac. 3 ro. 26 po.
and so to find the meadow and arable land the statements are

For the meadow 17 : 8 } :: 1 ac. 3 ro. { : 3 ro. 24 po.
" arable 17 : 15 } 26 po. { : 1 ac. 2 ro. 30 po.

Grammar.

1. (*a*) *For* is a conjunction connecting the principal sentence 'The pass was left' with 'then they wind . . . was seen.' The latter being a principal sentence (complex). *Where*, an adverbial conjunction connecting the subordinate sentence 'neither tree nor turf was seen' with the principal sentence 'then they wind,' etc.
(*b*) *Left*, complete participle qual. *pass*.
Seen, " " referring to *tree* and *turf*.
Participles differ from verbs in merely attaching themselves to nouns like ordinary adjectives.

2. If an enlargement is always to be an adjective or to partake of the nature of an adjective, then properly speaking the simple *subject* and *object* (generally nouns) are capable of enlargement, as 'The *carrier's* cart stands yonder.' 'Victoria, Queen of England, is also *Empress of India*.' 'I like a boy *of a good disposition*.'

Geography.

1. *See same question answered under candidates in this number of Magazine.*

2. *Gambia*, at the mouth of the Gambia, was founded in 1631 as a place for trading in slaves. It produces palm-oil, gold-dust, and gum. *Sierra Leone*, in the basin of the Rokelle, colonized by free negroes in 1787. It is very unhealthy. *St. Helena* was discovered by the Portuguese, occupied by the Dutch and taken by Britain 1651. It forms a station for ships sailing to India. *The Cape* discovered by Diaz 1487, colonized by the Dutch 1652, taken from them by the British 1795, but afterwards restored. Recaptured 1806. Is the maritime key to India and the East. It produces wool, wheat, and wine. *West Griqualand*, famous for its diamond fields, was ceded to Britain 1873. *Natal* was made a separate colony 1824. *British Kaffraria* was incorporated with Cape Colony in 1866, and *Basutoland* was annexed 1868-71. The climate of South Africa is very dry, but mild and healthy. The soil is fertile where well watered and the vegetation abundant. No forests occur except in Natal. The Island of Mauritius, taken from the French in 1810, exports sugar, rice, coffee, and ebony. It is a valuable calling-place for Indian vessels.

History.

1. Of the Saxon kings mention may be made of *Egbert*, who united the kingdoms of the Heptarchy under the common name of England, 827.

Alfred, the most celebrated of all the Saxon kings, rescued his kingdom from the Danes, established a regular militia, and built a fleet of ships. But it was as a legislator that he earned his greatest fame. He drew up a code of laws which is still considered as the basis of English common law. As a man he was brave, temperate, industrious, and learned, the aim of his whole life being to promote the happiness of his people, and no man ever better deserved the surname of Great.

Of the Norman kings, the most illustrious was William the Conqueror, both for the conquest of England, the compilation of Dooms-day book, the establishment of the Feudal System, and the consolidation of the kingdom.

2. Henry III., succeeding to the throne at the early age of ten, a regent, Hubert de Burgh, was appointed, who soon, by wisdom and prudence, brought back the rebellious nobles to the young monarch. Henry, however, showed the weakness of his character by inviting his wife's relations and other Frenchmen to England. The English were enraged at the bestowal of dignities and offices on these men, and insisted on Henry's summoning a council to redress the national grievances. This council has been generally called 'the mad parliament.' The great champion of the liberties of the people was Simon de Montfort, who, along with eleven others, was appointed to reform the state by the Provisions of Oxford. Henry, however, could not sanction the sweeping measures proposed, and a civil war broke out. The result was that the king and his son, prince Edward, were taken prisoners. The latter managed to escape, and eventually succeeded in defeating and slaying De Montfort at Evesham, 1265.

3. *Danegelt* was a tax levied by Ethelred the Unready for the purpose of buying off the Danes who were spoiling the country. This cowardly plan only caused the enemy to return in larger numbers to demand larger sums. *Magna Charta* was the famous document signed by King John, 1215, confirming many of the chief privileges which free Englishmen still enjoy.

Composition.

NOTES ON SHIPS OF WAR.

Structure.—Heavier and stronger than merchant ships of the same size; decks adapted to bear the weight and recoil of the guns; formerly all built of timber, even after iron was used for trading ships, the splinters of the iron when the plating was penetrated by shot causing great havoc among the crew; now every warship, either wholly or partially, covered with shot-proof armour.

Kinds.—First, second, third-rate line-of-battle ships; frigates, sloops-of-war, ironclads, turret ships, rams, etc.

Parts.—Ships of war designated by the number of decks having complete batteries of guns; may have an orlop-deck, near the water level; lower-deck or gun-deck; the main-deck; the upper-deck, with poop and quarter-deck.

Ships-company.—Captain, first lieutenant, sailing master, purser, midshipmen, boatswain, gunner, sailmaker, carpenter, marines, blue-jackets, etc., numbering in a first-rate upwards of 1000 souls; the strictest discipline required.

Uses.—A maritime country like ours needs a powerful navy for preventing invasion and for the defence of her numerous colonial possessions and dependencies, which are scattered over the surface of the globe.

Euclid.

1. A *proposition* may be either a *problem* or a *theorem*. (1) A problem, which requires some geometrical *construction* to be *effected*, consists of the *data* or *things given*, and the *quæsita* or *things sought*; (2) a *theorem*, which requires some geometrical *property* to be *demonstrated*, consists of the *subject* or *hypothesis*, and the *conclusion* or *predicate*. The connected course of reasoning by which a geometrical truth is established is called a demonstration, and when a result is established by showing that some absurdity follows from supposing the required result to be true, this mode is called the *reductio ad absurdum*. Prop. 4, bk. 1.

2. Prop. 22, bk. 1.

[In consequence of the pressure upon our space, we are compelled to hold over the remainder of these Questions till next month.]

—o—

Publications Received.

Arithmetic—

(1) Ellery's Marlborough Arithmetical Test Cards. II. to VI. W. and R. Chambers.

Domestic Economy—

(1) Fothergill's Domestic Economy for Schools. W. Isbister.

(2) Domestic Economy Test Cards. I., II., III. W. and R. Chambers.

Geography—

(1) Hughes's Class Book of Modern Geography. G. Philip and Son.

(2) Philip's Comprehensive Atlas. G. Philip and Son.

(3) Philip's Student's Atlas. G. Philip and Son.

(4) Philip's Select Atlas. G. Philip and Son.

(5) Philip's Introductory Atlas. G. Philip and Son.

(6) Philip's School Atlas of Physical Geography. G. Philip and Son.

(7) Morrison's Historical Geography. Simpkin, Marshall, and Co.

(8) Morrison's Second Geographical Reader. Gall and Inglis.

Grammar—

(1) Meiklejohn's Standard Grammar. IV. W. and R. Chambers.

Miscellaneous—

(1) Saville's Civil Service Coach. Crosby Lockwood and Co.

(2) Ward and Lock's Pictorial Atlas of Nature. Ward, Lock, and Co.

(3) Jackson's Code Poetical Reader. Burns and Oates.

Music—

(1) The Musical Review.

Periodical Literature—

(1) Ward and Lock's Universal Instructor. X. Ward and Lock.

SCHOLARSHIP EXAMINATION.

ERRATA.

IN consequeuce of the haste in which our answers to these were drawn up for the press, several more or less serious mistakes have been made. Through the kindness of some twenty correspondents, we point out the following:—

(1) P. 297. Section VI. Ques. 1.
£39 10s. 6d. × 10 is given as £398 9s. 0d. instead of £395 5s. 0d. This will make the answer £3 4s. 0d. less, so that the real result is £537 10s. 9½d.
(F. J. W., J. A. W., H. J. W., and others.)

(2) P. 298. Section VIII. Ques. 2.
For £66,000,000 read £6,600,000. (J. A. W.)

(3) P. 298. Section X. Ques. 1.
We were misled by the question, which contains the words 'The same amount of interest,' to calculate the *amount* instead of the *interest*. Nevertheless M. B. is just a little tedious in the method he suggests. The interest on £500 for 3 years at 5% is $£500\{(1{\cdot}05)^3 - 1\} = £500\ (·157625) = £78\ 16s.\ 3d.$ Making this correction, £100 is easily found to be the right answer.
(M. B., J. A. W., and others.)

(4) P. 300. Section IX. Ques. 2.
We have omitted to subtract the breadth of the passage. This gives 9½ ft. instead of 11½ ft., and an area of $9\frac{1}{2} \times 12 = 114$ feet. (J. A. W. and others.)

—o—

Query Column.

*** *Communications for this column must reach the Office not later than the 15th inst., and should be addressed,* 'THE QUERY EDITOR' of the *Practical Teacher*, Pilgrim Street, Ludgate Hill, London, E.C. *Correspondents must in all cases remember to give their true names, not necessarily for publication, but as a guarantee of good faith, and for facility of reference.*

We are now receiving such a number of Queries that we shall be obliged for the future to limit each correspondent to ONE *question. When more than one are sent, we shall, if possible, give slight hints for the solution, or solve the most difficult only. All, however, who adhere to our rule may be sure of having their difficulties fully explained.*

We should be much obliged if correspondents who send numerical or algebraical questions for solution, and are able from any source to give the required answer, would do so. It would save much time at present spent on verification.

1. 'E. H. S., Sittingbourne, will thank any reader who has passed the Third or Fourth Stage, Mathematics, of the Science and Art Department, to recommend Text Books for the same.'

Correspondents wishing *us* to reply to such questions must enclose in all cases a copy of the latest regulations. They will not then have to wait a month for their answer.

2. Parse the words in italics in—

> 'O blest *retirement, friend* to life's decline,
> *Retreat* from care *that* never must be mine.'

The only difficulty here is with '*friend*' and '*retreat*,' which are in apposition to 'retirement,' and in the same case.

Grammars differ as to '*retirement*.' Some would call it 'appellative nominative,' others 'vocative.'

3. JOHN WILSON, Esq., M.A., F.R.S.E., Bannockburn, is kind enough to send us two solutions to Query No. 21, Aug.

'Find a number of 6 digits with 7 in the unit's place such that, when the left-hand figure is removed to the right hand, the number thus formed is equal to three times the original number.'

The following, being more direct than the one we gave, is worthy of notice:—

Denote the number by

$$a\,|\,b\,|\,c\,|\,d\,|\,e\,|\,7.$$

When a is transposed this becomes

$$b\,|\,c\,|\,d\,|\,e\,|\,7\,|\,a.$$

But this is three times the ast; ∴ since $3 \times 7 = 21$, $a = 1$.

The number now is

$$b \mid c \mid d \mid e \mid 7 \mid 1.$$

If we had proceeded to find this figure 7 by multiplication, we get that 7 is the remainder on dividing $3e + 2$ by 10.

This would be the case if $3e + 2 = 17$,

or $3e + 2 = 27$,

and $3e + 2 = 37$ is not admissible, because e is less than 10. Also $3e + 2 = 27$ is not admissible, because e is integral.

Hence $3e + 2 = 17$, $\therefore e = 5$.

The number now is

$$b \mid c \mid d \mid 5 \mid 7 \mid 1.$$

Similarly,

$\frac{3d + 1}{10}$ leaves remainder 5, $\therefore d = 8$;

$\frac{3e + 2}{10}$ " " 8, $\therefore e = 2$;

$\frac{3b}{10}$ " " 2, $\therefore b = 4$;

$\therefore$ number = 142857.

4. JOHN ELKINGTON, Bradford.—Examine the answers to the following questions in 'Practical Arithmetic for Standard VI.':—

Ex. 83. No. 2 in C.

Evaluate $\frac{3}{4}$ of $\frac{1}{2}$ of $\frac{4}{15}$ of $\frac{25}{3}$ of £3 15s.

$$= £\frac{15}{4} \times \frac{1}{8} \times \frac{4}{15} \times \frac{5}{2} \times \frac{15}{4} = £\frac{225}{64} = \text{half the original sum},$$

$$= £1\ 17s.\ 6d.$$

Ex. 87, No. 6 in D.

$$\cdot 3125 = \frac{3125}{10000} = \frac{5 \times 625}{16 \times 625} = \frac{5}{16}, \text{ and not } \frac{1}{32} \text{ as stated.}$$

$\frac{1}{32}$ is of course $\frac{1}{10} \times \frac{1}{16} = \cdot 03125$, and this was probably what was meant.

5. MARY BERNARD, Marlow.—A field exactly forty yards square is crossed at equal distances by four straight walks, each 12ft. wide. What is the size of the equal parts into which they divide the field? and what length of iron hurdles will be required to enclose them?

Total area of field = 40^2 square yards = 1600 square yards.
Four paths, 40 yards by 4 yards = 640 "
Area remaining = 960 "
Area of each part = 192 "

(For since *one* path divides the field into *two* portions, *four* paths will divide it into *five* portions.)

What is next required is the amount of fencing which each one of these portions takes.

One side has a length 40 yards; the area is 192 yards; $\therefore$ the other side is $\frac{192}{40}$ yards long = $\frac{24}{5}$ yards. Hence the total perimeter = $2(40 + \frac{24}{5}) = 89\frac{3}{5}$, which is the answer you give.

6. E. L. S., Leeds.—Divide the number 208 into two parts, such that the sum of the fourth of the greater and the third of the less is less by 4 than 4 times the difference between the two parts.

Let $104 + x$ and $104 - x$ be the parts.

Their difference is $2x$.

Then we have at once

$$\frac{104 + x}{4} + \frac{104 - x}{3} = 8x - 4;$$

$$\therefore 3(104 + x) + 4(104 - x) = 12(8x - 4),$$

$$312 + 3x + 416 - 4x = 96x - 48,$$

$$728 + 48 = 97x = 776,$$

$$\therefore x = 8.$$

Hence the parts are 112 and 96.

7. E. L. S., Leeds.—

Solve $\frac{10}{x} - \frac{14 - 2x}{x^2} = \frac{22}{9}$.

Multiply throughout by x^2.

$$10x - 14 + 2x = \frac{22x^2}{9}.$$

Or $22x^2 = 9(12x - 14)$;

i.e. $11x^2 - 54x + 63 = 0$,

$$(11x - 21)(x - 3) = 0;$$

$$\therefore x = 3 \text{ or } \frac{21}{11}.$$

8. E. A. S., Birmingham.—Suppose the son receives £x. Then the daughter receives £$(1000 - x)$.

Now $\frac{x}{5} - \frac{1000 - x}{4} = 10$.

Multiply throughout by 20.

$$4x - 5(1000 - x) = 200,$$

$$9x = 5200,$$

$$x = £\frac{5200}{9} = £577\ 15s.\ 6\tfrac{2}{3}d.,$$

Hence the daughter's share is £422 4s. $5\frac{1}{3}$d.

9. J. W. SMITH, Radcliffe.—A field of 7 acres is sown with turnips, beet, and cabbage; the areas of the crops being respectively as $1\frac{1}{2} : 1\frac{1}{3} : 1\frac{1}{4}$. If the values of an acre of each be also respectively in the same ratios, and an acre of turnips be worth £7, what is the worth of the whole crop?

Areas are as $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$.

as $16 : 18 : 15$.

Hence $\frac{16 \times 7}{16 + 18 + 15}$ acres are devoted to turnips, *i.e.* $\frac{7}{3}$ acres.

An acre of turnips is worth £7;

$\therefore$ whole worth of turnips is £16.

It is obvious that the whole worth of the other crops is as

$$16^2 : 18^2 : 15^2;$$

$\therefore$ whole worth of crops

$$= 16\left\{1 + \frac{18^2}{16^2} + \frac{15^2}{16^2}\right\}$$

$$= £(16 + \tfrac{81}{4} + \tfrac{225}{16})$$

$$= £16 + £20\ 5s. + £14\ 1s.\ 3d.$$

$$= £50\ 6s.\ 3d.$$

10. H. E. S., Ashford.—Your solution would do well enough. We know nothing about the 'marking' of the Scholarship Answers.

11. ENQUIRER, Ossett.—We do not know of any reliable Pronouncing Dictionary of Proper Names. We have already in these columns recommended a Geographical Pronouncing Dictionary.

12. NOVELIST wishes to know what to do with a novel that he has written. The soundest advice we can possibly give him is to burn it. 'Some of the well-puffed fashionable novels of eighteen hundred and twenty-nine hold the pastry of eighteen hundred and thirty; and others which are now extolled in language almost too high-flown for the merits of Don Quixote will, we have no doubt, line the trunks of eighteen hundred and thirty-one' (Lord Macaulay on *Mr. Robert Montgomery's Poems*). Even if 'Novelist' deems this judgment not fitting to his production, he should recognize that very few novelists rise to eminence without being able to spell.

If he persists in wishing the world to see his knowledge, or deplore his lack thereof, he should send it to any one of the best-known publishers of novels, whence there is a not infinitesimal chance that he will get it 'returned with thanks.' We may mention *Elder, Hurst, Blackwood, Nisbet*, and *Murray*.

13. J. T. L., Staplehurst, sends us a letter, part of which is worth quoting:—

'What puzzles me is why so many words and processes are employed [in Geometry]; for instance, to raise from the point B, at the end of the line AB, a perpendicular to the said AB. Without all the directions about compasses, etc., why may I not just clap [*sic*, a not very geometrical expression—ED.] my carpenter's square on the line AB, and the other leg will give me a perpendicular at once? . . . . Does it really mean that before I can slit a board (down the middle, for instance) I must make one of those drawings on the board?'

The main fallacy in this reasoning is to suppose that Euclid is more an end than a means. As a general rule, with of course very marked exceptions, the result of a Geometrical investigation is not in itself valuable in practice. Its importance lies in its being part of a general method, or an illustration of a certain principle, which of itself is capable of application, and often leads to consequences which are of vital interest to the mere mechanician. In other words, Geometry is a species of training, the higher Mathematics and the cultivation of the reasoning powers being the ends in view.

It will be satisfactory to give a few instances of actual application:—

(1) There is a conical hill. A is at one side of it, B is at the other. A wants to bore a tunnel to B, and has no implements but a measuring-chain. The slopes of the hill are very abrupt, so that A can circumvent it, but cannot climb it. He requires to know how many feet in length his tunnel will be.

Your carpenter's square would be little good here, and yet poor despised Euclid is invaluable. Proposition 47, Book I., helps us out of the difficulty at once. Let A walk on the level in any distance in a straight line until he come in sight of B, and then continue to walk on in the same direction until the line in which B appears is at right angles to his path. This point may be found by Euclid i. 12. Suppose he has then walked half a mile. Let him now walk straight to B, which we will say is three furlongs additional. Then the proposition in Euclid to which we referred tells us at once that A was originally five furlongs from B, for $5^2=3^2+4^2$.

(2) Suppose you want to make a perfect oval. You cannot do it with your tools. Yet higher Geometry shows you at once how to do it with nothing more recondite than two pegs, a piece of string, and a pencil.

14. M. WILLIAMS, Mossley.—No.

15. JOHN ROBERTSON, Glasgow.—The School Correspondent must write.

16. LIZZIE AMOS, Rayne.—The Educational Department do not determine the work, as in the case of males. The words of the syllabus are, 'Parsing and Analysis of a passage in prose or verse from some well-known standard author.'

Write to the Secretary of the College at which you intend to sit.

17. D. R. H., Hull.—We intend to publish Mundella's speech on 'Education.'

We do not think Green's book is out yet.

18. D. A., Nottingham.—Rev. W. F. Moulton, D.D., has written a good book on the subject you name—'History of English Bible.' Publisher, we believe, is Cassell. Dr. Angus also has a book remotely connected with it; publishers, the Religious Tract Society.

19. W., Willington.—Begin with 'Easy Lessons on the Mechanical Powers' (London: Joseph Hughes), then try Browne's 'Elementary Mechanics,' or Magnus's treatise on the same subject.

20. PUPIL TEACHER, Brynman.—Chardenal's series is, perhaps, the best.

21. ISAAC MATTHEWS, Swansea.—A and B engage to do a piece of work for 30s. A could do the work alone in 4 days, and B in 5 days; with the help of a boy it is completed in 2 days: how should the money be divided? (*Barnard Smith.*)

A does work in 4 days,
∴ he can do $\frac{1}{4}$ of work in a day,
∴ he does $\frac{1}{4}$ of work in 2 days.
B does work in 5 days,
∴ he does $\frac{1}{5}$ of work in a day,
∴ he does $\frac{2}{5}$ of work in 2 days.

There is only $\frac{3}{20}$ of work left, and the boy does this. Hence A should have $\frac{1}{2}$ of the total pay, *i.e.*, 15s.; B $\frac{2}{3}$ of the pay, *i.e.*, 12s.; and the boy 3s.

22. R. K. S., Clapton.—A person travelled from London to Loch Lomond (480 miles), by sea, rail, and coach. The distance by coach was $\frac{1}{7}$ that by rail, and the distance by rail was $\frac{3}{10}$ that by sea. How much did the whole journey cost, coach fare being 4d. per mile?

There are obviously too few facts given. If we represent the distance by sea by 10, that by rail is 3, by coach 1;

∴ $\frac{1}{14}$ of journey was by sea, *i.e.*, 342$\frac{6}{7}$ miles.
$\frac{3}{14}$,, ,, rail, *i.e.*, 102$\frac{6}{7}$,,
$\frac{1}{14}$,, ,, coach, *i.e.*, 34$\frac{2}{7}$,,

Hence the journey by coach cost 136$\frac{8}{7}$, or 137$\frac{1}{7}$ pence. This is as far as we can go. To get your answer, £2 10s., by Conjectural Emendations would be waste of time.

23. D. J. H., Airdrie.—A certain fraction exceeds $7\frac{1}{2}$ by $5\frac{5}{12}$; another is less than $5\frac{1}{2}$ by $3\frac{1}{4}$: find the product of the sum, and difference of the two fractions.

First fraction ... $= 7\frac{1}{2}+5\frac{5}{12} = 12\frac{3+2}{24}$
$= 12\frac{5}{24}$
Second fraction $= 5\frac{1}{2}-3\frac{1}{4} = 1\frac{28-6}{24}$
$= 1\frac{22}{24}$
Sum of these ... $= 13\frac{27}{24} = 14\frac{1}{8}$
Difference ... $= 10\frac{7}{24}$
Product of these two $= 1\frac{1}{8} \times 3\frac{17}{24}$
$= \frac{9}{8}\frac{89}{24}$
$= 145\frac{17}{192}$

24. D. J. H., Airdrie.—Try Gill's Drawing-books.

25. A. P., London.—We are sorry to disappoint you, but we really can't understand your Questions. They are far too technically worded. You can't expect us to be a walking Cyclopædia of everything, including Railway Clearing House abbreviations.

26. R. HAIL, Camberwell.—We think the answer should be £46 9s. 4d., instead of £49 9s. 4d.

£46 9s. 4d. $=\frac{1}{20}$ £(1394) $=\frac{1}{20}$ {1987 − £397 8s. − £195 12s.} = etc.

27. CHELTONIAN, Newchurch.—Ash saplings after 5 years' growth are worth 1s. 3d., and increase in value 1s. 3d. each year afterwards. For their growth they require each twice as many square yards as the number of years they are intended to grow before cutting. A plantation is arranged so that each year the same number may be ready for cutting. Find the greatest annual income which can be obtained per acre, allowing 20 per cent. for expenses. (St. John's College, Cambridge, December, 1870.)

We think there must be some mistake in the sum as you have quoted it. We cannot obtain your answer, nor do we at present see any but a very complex *Arithmetical* solution. By Algebra, of course, it is easy.

28. NERO, Pontypridd.—In a triangle if the lines bisecting the angles at the base be equal, the triangle is isosceles.

We give the following Trigonometrical proof. A Geometrical proof is easy by *reductio ad absurdum*, or directly as in the *Appendix* to Todhunter's *Euclid* (Macmillan, 3s. 6d.).

ABC be Δ. BE bisect ABC, CF, ACB.

$$BE=CF, \therefore \frac{a \sin C}{\sin\left(A+\frac{B}{2}\right)} = \frac{a \sin B}{\sin\left(A+\frac{C}{2}\right)}$$

$$\therefore \sin C \sin\left(A+\frac{C}{2}\right) = \sin B \sin\left(A+\frac{B}{2}\right)$$

From this equation easily C = B.

29. A. L. BALL, Cardiff.—We have answered your question before in the *Query Column*.

30. VERITAS, Sandown.—How long will a train 280 ft. in length, going at the rate of 18$\frac{1}{2}$ miles per hour, take to pass a train 182 feet long, coming in opposite direction at rate of 34 miles an hour?

The rule (see *Query, No.* 17, June) is, Add the rates and add the lengths, and find what time a point moving with the total rate takes to travel the sum of lengths.

Total rate 52$\frac{1}{2}$ mls., length 462 ft.
60 mls. per hour is 88 ft. per sec.
52$\frac{1}{2}$,, ,, $\frac{105}{120} \times 88$,,
,, ,, 1 $\frac{120}{105 \times 88}$ secs.
,, ,, 462 $\frac{462 \times 120}{105 \times 88}$
Answer, 6 seconds.

31. R. GIBBONS.—Your data are insufficient.

Recent Inspection Questions.

[*The Editor respectfully solicits contributions—all of which will be regarded as* STRICTLY PRIVATE—*to this column. For obvious reasons, it cannot be stated in which district the questions have been set.*]

Arithmetic.

STANDARD I.

(1) Add together eight thousand four hundred and nine, six hundred and eighty-seven, nine thousand four hundred and ninety, seven thousand eight hundred and sixty-seven, and twenty-three. Ans. 26,476.

(2) From six thousand four hundred and two, take eight hundred and forty-seven. Ans. 5,555.

(3) Take one hundred and forty-two from two hundred and sixteen. Ans. 74.

STANDARD II.

(1) Multiply ninety-eight thousand seven hundred and fifty-six, by six hundred and eight. Ans. 60,043,648.

(2) Divide twelve thousand and fifteen, by seven. Ans. 1,716 + 3.

(3) Take nineteen thousand five hundred and forty-seven, from twenty-six thousand and eleven. Ans. 6,464.

(4) Find the sum of seven hundred and eleven thousand six hundred and ninety, ninety-nine thousand and thirty-six, two hundred and twenty-six thousand four hundred and nine, seven hundred and forty-three thousand six hundred and fifty-four, and two hundred and sixty thousand four hundred and twenty-four. Ans. 2,041,213.

STANDARD III.

(1) Divide five hundred thousand five hundred and forty-four, by eight hundred and sixty-nine. Ans. 576.

(2) From ten thousand pounds and a farthing take nine thousand seven hundred and sixty-four pounds seventeen shillings and a farthing. Ans. £235 3s.

(3) Add together one hundred and seventy-five pounds ten shillings and ninepence, one hundred and ninety-four pounds fifteen shillings and eightpence, seventeen thousand one hundred and sixty-four pounds sixteen shillings and sevenpence halfpenny, nine hundred and ninety-nine pounds two shillings and sevenpence, sixty-seven thousand eight hundred and sixty-four pounds nineteen shillings and elevenpence three farthings, six hundred and forty-two pounds three shillings and eightpence halfpenny, eight thousand seven hundred and sixty-four pounds nine shillings and twopence halfpenny, and six hundred and forty-eight pounds two shillings and sixpence. Ans. £96,454 1s. 0½d.

(4) I spent 1s. 1d. on sugar; 1s. 1½d. on bacon; 2s. 10d. on ham: 4s. 2½d. on currants; 6d. on soap, and 3½d. on cheese. If I offered a sovereign as payment, what change ought I to receive? Ans. 9s. 11½d.

STANDARD IV.

(1) If one horse cost seventy pounds eleven shillings and tenpence farthing, what would forty-nine cost? Ans. £3,459 0s. 10½d.

(2) How many inches are there in a telegraph wire measuring four miles and five hundred and sixty yards? Ans. 273,600 inches.

(3) Divide seven hundred and ninety-nine pounds fifteen shillings and tenpence farthing by eighty-nine. Ans. £8 19s. 8½d. + 87.

(4) Find the sum of thirteen guineas, nine half-crowns, twenty-five sixpences, fifty-four shillings, and twenty-seven pence. Ans. £18 4s. 3d.

STANDARD V.

(1) If a pound of sugar cost threepence, find the worth of ten cwts., three qrs., and two pounds. Ans. £15 1s. 6d.

(2) Find by Practice the cost of a hundred articles at sixteen pounds three shillings and fivepence a-piece. Ans. £1,617 1s. 8d.

(3) A draper bought 916 yards of cloth at 15s. 9¼d. per yard, and sold it again at 17s. 6d. per yard. What did he gain? Ans. £79 3s. 11d.

(4) A bill—

7 yds. @ 6s. 6d. per yd.; 24 yds. @ 11½d. per yd.; 16 yds. @ 7d. per ft.; 19 reels @ 3d. each; and 8 yds. @ a farthing a yd.

£	s.	d.
2	5	6
1	3	0
1	8	0
0	4	9
0	0	2
Ans. 5	1	5

STANDARD VI.

(1) Reduce

(*a*) $5\frac{1}{2}$ ounces to the decimal of 1 lb. Ans. ·34375.

(*b*) 1·25 to a vulgar fraction. Ans. $\frac{5}{4}$.

(2) If 7 men mow a field of fifteen acres in six days, in what time will 24 men mow a field of twenty-eight acres? Ans. $3\frac{4}{15}$ days.

(3) Simplify

$$\frac{3\frac{1}{2}+\frac{5}{8}-\frac{3}{4}}{6\frac{2}{3}\times 1\frac{3}{10}} \qquad \text{Ans. } 1\tfrac{1}{16}.$$

(4) Divide the product of 756·08 and ·035 by ·005. Ans. 5292·56.

History.

SET TO STANDARDS IV., V., AND VI.

(1) What memorable events occurred in 1588, 1688, 1715, and 1759?

(2) Give some account of Drake, Strafford, Judge Jeffries, and Sir John Moore.

(3) Describe the growth of our Indian Empire.

(4) Who were Edward VI.'s ministers? On what plea was Edward VI. induced to desire Lady Jane Grey to be his successor? How was she connected with the Royal family?

Grammar.

STANDARD IV.

Parse:—

(*a*) The sun shines bright.

(*b*) The swan is a very gentle bird.

(*c*) The Assyrian came down like a wolf on the fold.

STANDARD V.

Parse and analyse:—

(*a*) After a few minutes he put his hands into his pockets.

(*b*) The warrant for the execution of Mary was unwillingly signed by Elizabeth.

STANDARD VI.

Parse and analyse:—

(*a*) Carlo, for that was the dog's name, was taught to be useful.

(*b*) He begins to work as soon as he begins to live.

THE HARVEST FIELDS.

Words by GEORGE BENNETT. *Music by* T. CRAMPTON.

Cheerfully. mf

1st TREBLES.
2nd TREBLES.
BASS.

1. Come, sing with us a joy- ous song Of the bu - sy har - vest time;... When the fields are bright with
2. The wav - ing grain is full and ripe On this bright and sun - ny morn,.... And the rea-pers' click sounds
3. The vil-lage swains and rud-dy maids With their will-ing help have come,.... And with cheer - y shout their

KEY A. *Cheerfully. mf* E. t.

1st TREBLES.
2nd TREBLES.
BASS.

gol - den light, And the corn is in its prime, And the corn is in its prime.....
sharp and quick, As they shear the rust - ling corn, As they shear the rust - ling corn.....
mirth ring out At the glad - some har - vest home, At the glad - some har - vest home.....

p *f* *p*

Of all the love - ly scenes of earth The var - ied sea - sons show,... Oh, the har - vest fields, the
While foll - 'wing near the wa - vy swathes In sheaves the lab - 'rers bind,... And the youth - ful hands en -
And when the last load crowns the stack To har - vest feast they go,..... And they do their best with

f. A. *p* *f* *p*

har - vest fields Are the fair - est that we know,.....
- twine the bands That a - round each sheaf they wind..... The har - vest fields, The har - vest fields, Oh, the
heart - y zest, With their fa - ces all a - glow.....

p *f* *f*

gol - den har - vest... fields!...

The Practical Teacher.

A MONTHLY EDUCATIONAL JOURNAL.

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The Editor cannot return rejected MSS.; authors should therefore retain copies.

TO ADVERTISERS.

Approved, *prepaid*, advertisements will be inserted in the *Practical Teacher* at the following rates:—

	s.	d.
20 words or under	3	0
Above 20 words and under 32 words ...	4	0
32 words and under 64 words	5	0
For every additional 10 words	1	0

Teachers Advertising for Situations.

	s.	d.
20 words or under	1	0
For every additional 10 words	0	6

IMPORTANT NOTICE.

THE August and September issue (Nos. 6 and 7) of the *Practical Teacher* will contain the Scholarship Questions, July, 1881, with model answers to every question in every subject. *Early orders should be given to the Booksellers.*

☞ **In reply to numerous inquiries, the Editor begs to state that a Series of Papers of special interest to Schoolmistresses will shortly appear in this journal. The first will be entitled 'How I Teach Needlework.'**

Monthly Notes.

THE RIGHT HON. A. J. MUNDELLA, M.P., AND PUPIL TEACHERS.—The Right Hon. A. J. Mundella, M.P., presided at the distribution of the prizes to the pupil teachers of the Westminster Teachers' Association, on the 27th July. Mr. Mundella was accompanied by Mrs. Mundella, Mr. Sydney Buxton, Mr. G. Potter, Mr. J. R. Langler, B.A., and others. Mr. Mundella, in the course of his address, said the Department with which he had the honour to be connected could do very little in the way of local assistance to pupil teachers. They could provide a code, give grants, and conduct examinations, but they could not supply that local interest which took care of the studies and the religious training of the pupil teachers, and which no central department of the Government could furnish. With regard to pupil teachers, they had entered upon a most honourable and dignified profession, at a time much more favourable for teachers than the times which had passed. There was a growing appreciation of the work of the teacher, and of the dignity of the teacher's office, in the minds of the people of this country. In conclusion the right hon. gentleman cautioned the pupil teachers not to be grant-earners or crammers, but to follow the example of those who were above the consideration whether they earned a few pounds more or less, and who had, in their classes, attained the best educational results. Mrs. Mundella then distributed the prizes.

SOUTHLANDS COLLEGE.—The Rev. G. O. Bate, Secretary of the Wesleyan Education Committee, has been appointed Principal of the Southlands College, Battersea, in place of the Rev. G. W. Olver, B.A.

THE GOFFIN CASE.—In the House of Commons, on the 8th August, Lord George Hamilton, in a long speech, brought forward the case of Mr. Goffin, headmaster of the United Westminster School, who in 1879 was found guilty by a Select Committee of a systematic course of fraud, falsehood, and subornation, in connection with the examination of the Science and Art Department, but who nevertheless has been retained in his position by the Governors. He spoke as to the antecedents of Mr. Goffin, and of his conduct at Exton and Woking, and said that, had the forms of the House permitted it, he would have moved a formal vote of censure on the Board. Mr. Warton, who rose after Lord George Hamilton, said that Mr. Goffin was a man of pre-eminent ability and high character, and contended that, as the Department and the school had parted company, the House had nothing further to do with the matter. Sir S. Waterlow defended the course pursued by the Governors, who thought that Mr. Goffin had been addicted to over-cramming, but acquitted him entirely of fraud. He censured the manner in which the inquiry had been conducted, and challenged the Department to prosecute Mr. Goffin. Sir J. C. Lawrence also defended the Governors; but Mr. Errington, as a member of the Committee, agreed with Lord George Hamilton. After some remarks from Mr. O'Donnell, Mr. Mundella said that in his opinion Mr. Goffin was guilty, that the Governors had made a great mistake in allowing him to continue in his office, and that the whole affair was a scandal. The House then went into Committee of Supply.

TRADES GUILD OF LEARNING.—A meeting of the supporters of the Trades Guild of Learning was held on the 8th August, in the Hall of the Society of Arts, the Earl of Rosebery presiding. His Lordship in opening the proceedings said they all knew that there were great technical schools coming, the foundation-stone of which had been laid the other day in London, and the same class of school abounded in France, Germany, and Switzerland, which did an immense deal of good to the workmen of those countries, and an immense deal of harm to the workmen of this, by the competition of the former. The great object of such

a Guild as theirs was not so much to give practical or manual instruction in the different handicrafts, as to teach the spirit and history of them. Such a society as this ought to have its work inspired by working men, and, unless they could obtain the hearty co-operation and support of the latter, he for one would be no party to the continuance of the association. Mr. Thomas Burt, M.P., then moved, 'That this meeting approves and pledges itself to support the objects proposed by the Trades Guild of Learning; viz., (1) To provide lectures on the history and principles of various industries, with a view to encourage the desire for improved technical education; and (2) to continue the general education which the Guild has carried on for some time by means of lectures and classes.' Mr. G. A. Sala seconded the motion, which was carried unanimously. Mr. H. Pratt moved, and Mr. Phillips seconded, the following resolution, which was agreed to:—'That the trade societies should be urged to co-operate as far as possible in organizing the proposed lectures and classes, and that the council should specially invite the support of the large employers of skilled labour in London.'

LIVERPOOL UNIVERSITY COLLEGE.—The scheme for establishing a University College at Liverpool is advancing. A petition, which has been signed by Lord Derby, Mr. Rathbone, M.P., Mr. Robert Gladstone, and Sir J. A. Picton, and which prays for the grant of a charter of incorporation, having been presented to the Privy Council, a charter has been granted in accordance with the suggested draft; and the council have already purchased a site for the necessary buildings.

THE NATIONAL THRIFT SOCIETY AND MR. MUNDELLA.—An important deputation from the National Thrift Society had an interview with Mr. Mundella at the Education Department on July 21st. The deputation consisted of Mr. Robert Freeman, Vice-Chairman of the London School Board, Colonel Jasper Willett, Mr. William Botley, M.S.A., Dr. J. Fosse-Harding, F.R.C.S., Major-General Batten, Mr. Hugh Owen, Rev. J. Russell, M.A., Major de Winton, Messrs. Alfred Knight, William Shaw, F. P. Doremus, E. Granville Eliot, and Mr. T. Bowden Green (Secretary of the National Thrift Society). Letters regretting their inability to attend the deputation had been received from Viscount Lymington, M.P., Mr. Samuel Morley, M.P., the Hon. and Rev. E. Carr Glyn, M.A., Mr. James Ranken, M.P., and Dr. N. H. Stevens, C.C. The deputation was introduced by Mr. Robert Freeman, who stated that the gentlemen present and others connected with the National Thrift Society had given a great deal of time and attention to the subject of Thrift being taught to the children at elementary schools; they had therefore come to offer the co-operation of the Society in practically carrying out the principles of Thrift which the Education Department was desirous of inculcating.—Mr. Mundella, in the course of his reply, said he could only express his gratitude for such 'a very opportune and very encouraging' visit. The National Thrift Society could help immensely in various ways, both through their own agencies and the agency of the London School Board. Mr. Freeman, as the Vice-Chairman of the Board, could induce that body to take up the matter, and to decide that every school and every branch of each school should have in connection with it a penny bank established by the National Thrift Society. Having assured those present that the Department were fully prepared to render the Society every possible assistance in the matter, the deputation thanked Mr. Mundella and withdrew.

Gossip.

It is with pleasure that we draw the attention of our readers to Mr. Mundella's speech, on August 8th, 1881, in the House of Commons, and to the 'Proposals for a New Code,' both of which appear in another part of our issue.

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We venture to think that, on the whole, they will prove highly gratifying to the profession, as many of the worst features of the old *régime* have disappeared.

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Perhaps the two greatest boons promised are the abolition of (1) *the individual payment for the individual pass*, and (2) the endorsement of a teacher's certificate when of the first class.

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Clause 41 is a concession which all felt must come sooner or later. It provides that 'no certificate shall be cancelled, suspended, or reduced until the Department has informed the teacher of the charges against him, and has given him an opportunity of explanation.

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That such fair and equitable dealing should not have been the rule hitherto seems monstrous.

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'Not more than three pupil teachers will be allowed in any school or department, whatever number of certificated teachers may be employed.' This is meant, doubtless, to remedy in a slight degree the glut in the educational market.

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Many eyes will be opened wide upon reading that portion of Mr. Mundella's speech which states, 'there will be some 76,000 school teachers without hope of employment when they have finished their apprenticeship.'

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On the face of these figures, it is hard for us to understand why, when one side door to the profession is shut, another should be opened to *incompetent* men and women simply because they hold a university degree which may, or may not, be worth the having.

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We write *incompetent* advisedly. The mere possession of a degree is no adequate qualification for the office of a teacher. Nor is the year's practice in an elementary school, which it is proposed these persons shall have.

There is a science and art of teaching, and it would afford us pleasure, as it would nearly every teacher in the country, to learn that no one would be permitted to practise the art who had not had the discipline of an apprenticeship and the training of a normal college.

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What struck us most forcibly upon reading the 'speech' and 'Proposals' was, the number of concessions made through the direct influence of the National Union of Elementary Teachers. And yet there are people who say that the National Union of Elementary Teachers is a failure. We hope these good people, who will benefit by the coming changes, will see their error and join one of the local associations without delay. Any information may be had gratuitously from the courteous and indefatigable Secretary of the Union, Mr. T. E. Heller, 7, Adam Street, Adelphi, W.C. Whilst congratulating the Union upon what it has done, we are no less sincere in doing honour to Mr. Mundella for the noble effort he has made to place the education of our country on a sound basis.

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The Rev. D. Waller has been appointed secretary of the Wesleyan Education Committee in place of the Rev. G. O. Bate, who goes to Southlands as the new principal of that college.

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Many of our readers will regret to hear that by the time they receive their PRACTICAL TEACHERS the Royal Polytechnic Institution will be a thing of the past. This once popular home of pleasant scientific instruction has collapsed.

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Dean Stanley, whose death, in the end of July, filled a whole nation with grief, will ever be remembered as an accomplished scholar and a liberal-minded Churchman. He was certainly the best Dean which the old Abbey has known.

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The last literary work on which he was engaged, was a short critical article on Robertson of Brighton, which will shortly appear in the pages of *Scribner's Monthly*.

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Mr. Elliot Stock will issue a magazine entitled the *Bibliographer* in the autumn; it is to be uniform in size and style with the *Antiquary*, and will be devoted exclusively to book-lore.

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Mr. Matthew Arnold has done a good work in making his *Selections from Byron*. The few words of introduction to the chosen poems are well and wisely written, and in conjunction with the text which they preface, form a fine monument to one whose poetry has not yet been properly appreciated. Mr. Arnold thinks that Wordsworth and Byron will remain the great literary heroes of the nineteenth century.

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A copy of *Three Ways of Spending Sunday, by Timothy Sparkes*, which is one of the earliest and rarest of Dickens' writings, has been sold in Manchester for £6 15s.

Messrs. Bickers are re-issuing in monthly parts, Mrs. Cowden Clarke's admirable *Concordance to Shakspere*.

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Apropos of Shakspere, we may state that Messrs. G. Routledge and Son are now issuing an *édition de luxe* of the works of our national poet, which will probably prove the most beautiful ever printed. It will consist of fifteen volumes, in imperial 8vo, and one thousand copies only will be printed. Eight hundred illustrations by Sir John Gilbert, R.A., will be printed on real China paper, and mounted in the text. Messrs. Clay, Sons, and Taylor are the printers.

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Messrs. C. Kegan Paul and Co. will issue in the early autumn a work which will prove of much interest to scholars and men of letters. We refer to the *Liturgical Poetry of Adam de St. Victor*, translated from the Latin by the Rev. D. S. Wrangham, M.A., Vicar of Darrington, Yorkshire. St. Victor's poetry has long been celebrated as possessing much beauty, and many of his best hymns have been rendered into English by Archbishop Trench. Mr. Wrangham's translation will be issued, side by side with the original Latin, in three crown octavo volumes.

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We are very much pleased to see that Mr. Mundella has announced that attention will be paid in the forthcoming code to good literature, and that Shakspere and Milton will be read in the upper standards. This is as it should be.

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Messrs. G. Philip and Son have just issued a new edition of Professor Hughes's *Class Book of Modern Geography*. The work has been revised and considerably extended. A full notice of it appears in another column.

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We are also glad to hear that the 'North of England School Furnishing Co.' will shortly issue, for 1881, their useful pamphlet, entitled, *What Her Majesty's Inspectors say*. The original arrangement of the text renders it of especial value to elementary teachers.

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Mr. Justin M'Carthy's *History of Our Own Times*, which has proved so successful a work, has been translated into French by M. Leopold Goirond.

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Dr. Hill Burton, Historiographer-Royal for Scotland, and one of Her Majesty's Commissioners for Prisons, died at Edinburgh on August 10th. Dr. Burton, who was in his seventy-second year, will be chiefly remembered for his well-written *History of Scotland*, which is undoubtedly the standard work on the subject. He was also the author of several well-known books, and contributed to the *Westminster*, *Edinburgh*, and *North British Reviews*.

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It is rumoured that Mr. Matthew Arnold will probaby retire from his present post as H.M.I., after completing his next report; and will then devote himself absolutely to literature and politics.

Messrs. Smith, Elder, and Co. will shortly publish a birthday-book, the designs for which have been executed by H.R.H. the Princess Beatrice. We hear that the work will be exceptionally beautiful. English printers are grumbling because the much-coveted work is being done abroad.

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We hear that the third volume of Dr. Geikie's *Hours with the Bible* is in the press, and will be published very shortly. It embraces the Bible History from Samson to Solomon, and has sixteen illustrations. Messrs. Partridge and Co. are the publishers.

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It is said—on German authority—that the book which has obtained the greatest number of readers in recent times is *Notre Dame de Lourdres*, by M. Lassere. This work has now reached its 150th edition.

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The international Geographical Congress, which is to be held at Venice, in September, will be attended by Lord Aberdare, President of the Royal Geographical Society, Sir Henry Layard, and Mr. John Ball, who will go as the official representatives of England.

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Publications Reviewed.

Murby's Imperial Grammar and Analysis. London: T. Murby, Bouverie Street, Fleet Street.

This Grammar is a great improvement on the mass of school grammars. It is clear, well-arranged, and to a considerable extent explanatory. Another almost peculiar feature is that it is progressive, beginning with a first course, or simple explanation of the Parts of Speech, to a second, in which these are treated of more in detail. Next follows a course of Syntax, with clear directions for Parsing. A course of Grammatical Analysis, or completion of Syntax, follows in a variety of useful explanations, given to aid the young student. A very serviceable chapter on Composition ends this useful little book.

With some of the definitions we should disagree, and also with the introduction of some new terms involving no apparent improvement on the old ones. This is common with many writers of grammar books. The chapter on Composition could be judiciously enlarged, together with the Hints on Style, which are so good that we wish there were more of them. We do not like the omission of the term *adjective pronoun*, and the absorption of these by the personal and interrogatives. The adjective pronoun in the sentence, 'This is *my* book,' is different and distinct from the personal possessive, 'This book is *mine*.' The including of the 'Article' under the 'adjective' is also open to objection, though advocated by many. In *a book*, or *an apple*, the terms *a* and *an* fail to carry out the idea of an adjective by giving any idea of the quality of the noun. The hints for Letter-writing are remarkably good, and might be extended to include forms of address to titled and other important personages.

Historical Reader. Standard IV. **Great Events in English History.** By E. Betkley. London: T. Laurie, Stationers' Hall Court.

The first chapters of this book, treating of the Britons, Romans, and Saxons, led us to expect a series of sketches in chronological order. But at the death of Henry III. we jump to the reign of Edward IV. and the murder of the princes in the Tower. Next follows an account of the Gunpowder Plot and the Great Fire of London. After this we are taken back to the Feudal System, the times of Edward I. and Edward III., the French Wars, and so on down to the Wars of the Roses. Next comes a sketch of the Battle of Waterloo, after which we are taken back to the Reformation, the Tudor Kings, and thence to the Stuarts. Now why these sketches could not be chronologically arranged, we see nothing in the book to justify. A few remarkable sketches from Macaulay or other brilliant writers might be expected to occupy places in general reading-books without regard to chronology, but a series of sketches by one writer which dodges needlessly backward and forward is perplexing and unsatisfactory. Altogether these sketches are generally well written, and in a style very suitable for the upper classes in schools. The account of the defeat of the Spanish Armada is a plain and spirited narrative of this signal event in England's history. The bad influence of Charles II. over English morals is also well described. An extensive list of questions occupies the last twenty-four pages in the book.

Marshall's Descriptive Geography Readers. Book II. The British Isles. London: John Marshall and Co., 42, Paternoster Row.

We suppose the words Geography and History must be allowed to be used adjectively, and with this preliminary objection we have much pleasure in drawing attention to the beautifully printed, more beautifully illustrated, and altogether useful and attractive book of Mr. Marshall's. Many of the illustrations are gems of wood-engraving, as *A Kentish Lane*, p. 131; *A Rustic Bridge*, p. 125; *Hop Gathering*, p. 75; *On the Tyne*, p. 57, and many others. All are, in fact, excellent.

The first chapter opens with a picturesque description of a British village some 2,000 years ago, and is followed by a short sketch of the advent and departure of the Romans, a short glance at the coast of England, a brief account of the principal river basins, and next of the most prominent features of our manufactures, agriculture, and commerce. A few of the leading railways are next succinctly described, together with the most striking features of a few English counties. Wales and Scotland are next briefly sketched, and the book ends with a short account of Ireland. A prevalent tone of the book is plain, yet not unattractive description, apart from fine writing or poetical allusions, which in a book on this subject for young readers would be out of place.

Henry's First History of England. Laurie's Kensington Series. Standards II. and III. London: T. Laurie, Stationers' Hall Court.

Mr. Laurie tells us in his introduction that the Ancient Britons 'at first lived in caves; but afterwards they made huts of basket-work for themselves, of a round form, somewhat like bee-hives.' Notwithstanding the researches of modern scholars, Pike, Nicholas, and others, we scarcely open a book on elementary history that does not contain the usual nonsense about the Britons being a mere horde of savages, etc., etc. Here we find them relegated to the cave-dwellers. A glance in one of the rooms of the British Museum will show the exquisite specimens of gold and other ornaments used by these so-called 'savages,' who also had well-constructed war-chariots, and a priesthood so renowned for learning as to cause Britain to be resorted to as a seminary to the students from Gaul. We need pursue this matter no further, and are sorry to admit that Mr. Laurie herein has a numerous company of writers who agree with him. After taking leave of the Britons, Mr. Laurie gives us some well-written sketches of the leading features of the Saxons, Danes, and so on to the Norman Conquest. Hence we are taken by chapters remarkably adapted for juvenile reading along the leading lines of English history, in

which the most salient features are simply and clearly described. Now and then the generally easy flow of the narrative is broken by short, jerky sentences, as the following :—

'Simon de Montfort was killed soon after in a battle.
'The king died in 1272.
'You see that the only good done during his reign was not done by him, but very much against his wish.
'Henry III. had four children—two sons and two daughters.
'A remarkable man, called Roger Bacon, who invented a number of useful things, lived in this reign.'

The characters of the kings and others are given with fairness, are not unduly obtruded, and the style altogether is well adapted for juvenile readers. The first book, for Standard II., carries us down to the death of Richard III. at Bosworth. After which the subject is taken up for Standard III. to the present time.

Third Geographical Reader, for Standard IV. Part II. **Scotland, Ireland, the Colonies and Dependencies.** London: W. Isbister, Ludgate Hill.

This book forms the second part of the two devoted to the British Empire, the preceding one taking up England and Wales for Standard III. Like the rest of the series, the volume before us is a model in the way of printing and illustration. The maps, too, are good. The text combines a systematic description of their countries mentioned, together with their principal historical associations, and is written in clear and lucid style. Portions to be committed to memory are placed at the end of each chapter. The explanation of geographical terms and names receives very properly due attention. After some judicious remarks on the nature of colonies, the author thus clearly distinguishes his dependencies or possessions from colonies in general: 'There are also many islands and countries in foreign lands which are held by our Government and peopled to some extent by English men and women, but which are not, strictly speaking, "colonies" because they are not tilled or cultivated by our countrymen. These places are styled "British possessions," because they are "possessed" by the British.' Such explanatory remarks, though most needful, occupy little space in ordinary geographies. Equally worthy of attention is the remarkable fact that 'there does not exist any where in the world a town or district of English-speaking people under an alien power. The same cannot be said of any other race.' Much more might be quoted equally satisfactory from this capital little book—not so little, by the way, as it consists of nearly 300 pages. In describing India the following judicious remarks do much to account for our success in the country:—'The manufactures of India were formerly domestic industries, conducted by special castes, each member of which worked at his own loom and in his own village. One of the results of British rule is the growth of mercantile towns. Our rule derives its origin from our commerce: from the first our efforts were directed towards creating centres from which to export and import goods. The Portuguese, the Dutch, the Danes, and the French had all failed in this respect; but we succeeded, and the two great capitals of commerce, Calcutta and Bombay, were made great under British control.' With such explanations, geography will not only be learned, but understood.

Philips' Introductory Atlas. 24 Maps, with Consulting Index.

Philips' Atlas of Physical Geography. New and Cheaper Edition.

Philips' Student's Atlas. 48 Maps, with Index.

Philips' Select Atlas. 36 Maps.

Philips' Comprehensive Atlas. 42 Modern Maps, and 18 Ancient Maps, with Index. London: G. Philip & Son, Fleet Street.

When we state that the above five atlases form a portion of a list of thirty-two, commencing with a threepenny one, containing sixteen maps, and including the excellent guinea 'Historical Atlas,' and the scarcely less valuable 'Training College Atlas,' we indicate the spirit with which Messrs. Philips have taken up this branch of educational publications. A cursory examination at any one of the series will satisfy any one of the excellent manner in which they are got up. They are clear, beautifully engraved, and carefully coloured. The names are introduced with great judgment, and, while fairly adequate to the countries represented, are free from the common fault of overcrowding. A copious index accompanies each of the larger atlases, with the latitude and longitude of each place mentioned. In the 'Introductory Atlas,' we should have preferred the substitution of a map of Turkey in lieu of Prussia, which latter is contained in that of the German Empire. The books are also strongly bound—no slight advantage in regard to an atlas—and as strongly fixed in strong cartridge backing. Another important desideratum is that of price; and when we have in Messrs. Philips' series beautifully executed maps at a penny each, the slight additional cost in regard to each book being involved in the binding and copious index, we have said enough to show that these books are cheap as well as good. The two series of outline maps—No. 31 on the list—are also most useful, and supply a widely felt want.

The 'Atlas of Physical Geography' will be very useful to students in these days, when so much attention is most properly given to this branch of the science. In this book we have, in addition to the mountain and river systems of the earth, a very fair general outline of the geological structure of the earth. This, of course, can can be but general and approximate in regard to a subject requiring very much in minuteness of detail. The great rock formations are shown, together with as much of other leading features as can be shown on a Mercator map. The first map of this Physical Atlas is remarkably clear and useful. In addition to the general configuration of the land and water, it shows the position and extent of the low-lying lands, the same in regard to the moderately elevated plains, and also the position and general features of the highest regions, on which the great mountain ranges are drawn. Some very pretty illustrations of Botanical and Zoological Geography are given, to show the general distribution of plants and animals as mainly depending on climatical laws, and consequently on elevation as well as latitude. Another suggestive map shows the distribution of man, and the comparative density or sparseness of the populations of the earth, together with the prevalence of the principal religions of the human race. In this the vast districts marked 'Heathen' show how much there is yet to be done for the spread of Christianity and its civilizing influences.

Class Book of Modern Geography. By William Hughes, F.R.G.S. London and Liverpool: G. Philip and Son.

This excellent text-book of Geography has been revised and brought down to the present year by Mr. J. Francon Williams, whose work has been done most satisfactorily in all respects. The name of William Hughes is, of itself, a passport to the accuracy and merits of any book on Geography, and there is no reason why the work before us should not take the place among the first, if not of itself *the first*, of geographical class-books. In addition to unfailing accuracy, this book possesses some unusually meritorious features. Among these are series of the best geographical questions to be met with. These are adapted both for oral and written tests, and both these methods should be extensively pursued in every geographical lesson. Next we may notice the value of the explanations

and derivations of geographical names. These are in most suitable cases traced to original sources, instead of being merely copied from second-hand or questionable authorities. In referring to the river names of most European countries the Celtic origin is often given, and thus we are led to the Sanscrit, the oldest form of European speech, from which most of our river names especially were derived. We are sorry in some instances that more frequent use was not made of Celtic or Cymric roots. In regard to the name *Cotswold*, we are told that the word originated 'probably from the *cots* for sheep and *wold*.' Now the word in question comes from the Welsh *coed*, a wood, to which was afterwards added the Teutonic *wold* of the same meaning. This example of the duplication of names by different races is by no means uncommon, as Harrow-on-the-Hill, where we have the elevated definition thrice given. We wish this explanation of names had also been carried further in the capital book before us, especially in regard to the names of our English counties, notwithstanding that some disputes would probably hereon arise. We should also like to see the short chapter on Mathematical or Astronomical Geography enlarged and accompanied by more explanatory remarks. In mentioning the depression of the earth at the poles, for instance, illustrations even as familiar as the whirling of a mop could be given. But these are trifling shortcomings in comparison with the general excellence of the book.

As examples of the bringing down of this book to modern times, we have a general summary of the recent events in Afghanistan down to June, 1881, the cession of Montenegro to Greece last November, and the occupation of Tunis by the French.

The amount of information contained in the 380 pages of this admirable class-book is remarkable. And when we state that this is not given in a bald way, but with a fair amount of explanation and in a readable style, we say nothing more than the book merits, but which few books of the same nature and design possess.

The Code Poetical Reader. Crown 8vo, 152 pp. London: Burns and Oates.

This book has been produced by the publishers in capital style. The printing, paper, and binding are faultless. To Mr. Jackson, the editor, high praise is due. His selections are admirable. The neatly arranged marginal notes, explanatory of the text, will be found very helpful. We gladly recommend the book.

Notabilia of English History. Crown 8vo, 64 pp. By W. Blanchard. London: Thomas Murby.

The preface of this book begins—'The grand maxim of learning is to fix the mind on the right things.' Upon looking carefully through these sixty-four pages, we are bound to say that the author has given us a goodly array of 'right things' to store away in the memory. Used side by side with an ordinary text-book, Mr. Blanchard's 'Notabilia' will prove of great assistance to students preparing for historial examination.

The Civil Service Coach. Fcap. 8vo, 208 pp. London: Crosby, Lockwood, and Co.

The title of this volume exactly describes its aims. What the living coach does for his pupil, this book does in a great measure for the student who has to plod his way single-handed. To all who contemplate entering the civil service, and to teachers who coach their boys for the Civil Service Examinations, it will be invaluable.

Glimpses of the Earth. By J. R. Blakiston. Fcap. 8vo, 320 pp. London: Griffith and Farran.

The same excellencies which marked the earlier volumes in this series are apparent in the book now before us. It will form an admirable reader. We are, however, sorry to find that Mr. Blakiston still adheres to his conviction that it is better a reading book—and of all others a *geographical* one—should be sent forth without a single picture to enliven its pages. In spite of this, these pleasant glimpses deserve to be widely read.

Introductory Geographical Reader. Fcap. 8vo, 96 pp. London and Edinburgh: W. and R. Chambers.

This serviceable little manual merits our highest praise. It is a simple, beautifully illustrated, and altogether charming introduction to the study of geography, and will be greatly appreciated by all who use it. When we state that the Messrs. Chambers are the publishers, our readers will know what to expect in the way of 'get-up.'

Harry Hawkins' H Book. London: Griffith and Farran.

We advise all our young friends who have any difficulty with their H's to invest a sixpence in this clever little brochure. It not only affords first-rate exercise in the use of the much-abused H, but if read aloud to a small party, will yield amusement. We question if the author is correct in aspirating the first letter in herb. We were always taught that it was silent.

Morality. Cr. 8vo, 158 pp. By Dr. Hime. London: W. Guest.

We need but say that Dr. Hime, the author of this book, has done his delicate and difficult task well. The perusal of these pages cannot fail to have a beneficial influence on those for whom they are designed. The Doctor has our best wishes in his praiseworthy efforts to raise the moral tone of our youth.

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Scholarship Examination, 1881.

Composition and Grammar.

MALE AND FEMALE CANDIDATES.

Two hours and a half allowed.

(No abbreviation of less than three letters to be used in parsing or analysis.)

Candidates must not answer more than *one* question in each of the Sections IV., V., VI.

Composition.

Write a letter descriptive of—

(1) The early signs of spring;
or, (2) Some museum with which you are acquainted;
or, (3) Some act of kindness or heroism which you may have witnessed;
or, (4) Some of the difficulties of a young teacher's life.

Grammar.

SECTION I.

Parse fully the words italicized in the following sentences (Syntax is an essential part of parsing):—

Yet *live* there *still*, who *can remember* well
How when a mountain-chief his *bugle* blew,
Both field and forest, dingle, *cliff*, and dale,
And solitary heath the *signal* knew;
And *fast* the faithful clan around him *drew*,
What time the warning note *was* keenly *wound*,
What time aloft their *kindred* banner flew,
While clamorous war-pipes yelled the gathering sound,
And while the Fiery Cross glanced, *like* a meteor, *round*.

SECTION II.

Analyze the following sentences, making a table, showing in separate columns—

(1) The nature of the sentence.
(2) (If dependent) its relation to the principal sentence.
(3) Subject.
(4) Its enlargement (if any).
(5) Predicate.
(6) Its extensions (if any).
(7) Object.
(8) Its enlargement (if any).

How to deal with him was a puzzling question.

While the lion and the tiger were tearing each other, the jackal had run off into the jungle with the prey.

Who spills the foremost foeman's life,
His party conquers in the strife.
If I suffer causeless wrong,
Is then my selfish rage so strong,
My sense of public weal so low,
That for mere vengeance on a foe
Those cords of love I should unbind
Which knit my country and my kind?

SECTION III.

Select and classify the pronouns, conjunctions, and adverbs in the sentences given above.

SECTION IV.

1. Write out rules for the spelling of those classes of words which include receiving, judgment, changeable, so far as relates to the part of the word printed in larger type.

2. Explain the terms reflexive, indefinite, and show in what sense they are applied to some of the parts of speech.

3. Explain the term subjunctive mood, and give examples of its uses.

SECTION V.

1. Show that the following words may represent two or more parts of speech—next, under, till, by, that, like.

2. Derive the following words—compact, arrange, acquaint, algebra, geography, dissuade, abroad, precede, suspend.

3. Give a noun, an adjective, and a verb, formed from each of the following Latin words—disco, sedeo, scribo, verto, duco, dico.

SECTION VI.

1. State whether the concords in the following sentences are incorrect, and give the proper rule of concord in each case:—

Neither she nor James were there.
Either Mary or Jane must fetch me their rake.
Scott's 'Tales of a Grandfather' were written for his grandchildren.

2. Explain the terms metaphor, simile, and give appropriate examples.

3. Give examples of defective English verbs, and show how the deficiencies are supplied.

ANSWERS—COMPOSITION AND GRAMMAR.

Composition.

(1.)

The Grange,
Abbotleigh, Co. Devon,
July 10th, 1881.

MY DEAR FRIEND,—The dreary winter, the miserable effects of which we were feeling when last I wrote to you, at length shows signs of disappearing altogether. The days are slowly, but surely lengthening; and although the mornings and evenings are still very cold, the power of the sun is felt during the day. The trees and hedgerows are bursting into leaf, and the grass has lost its withered look, and is now quite green and beautiful. Yesterday I took a walk down the dell, and found the banks literally covered with primroses, while here and there the modest white and purple violets might be seen just peeping above the ground. In the clump of elms behind the Grange the rooks are again to be heard, while the lark and the thrush and the linnet make the air vocal with their melodies. The farmers in the neighbourhood can now commence the sowing for early crops, and every hand is now employed out of doors in ploughing, harrowing, or such-like operations. The coming of spring adds new pleasure to our daily existence, and it needs only your company to make my stay not only endurable, but pleasant. Can you not make it convenient to come? With kindest regards,

I am,
Yours very faithfully,
JEAN PAUL.

(2.)

110, Bridge Street, Burfleet,
Co. Blank,
July 10th, 1881.

MY DEAR SIR,—The Museum of which our town can boast is a source of great pleasure and instruction to thousands of the inhabitants. Since its removal to the new premises, the attendance is even more numerous than before. The Museum stands at the foot of the park, and some of its windows command a most delightful view. Entrance is obtained from one of the main streets of the town into a large hall, at the farther end of which there is a large conservatory, filled with choice native and exotic plants, and enlivened by the songs and voices of many caged birds. The hall is adorned with statues of local celebrities and models of ships and other objects for which our town is famous. Folding doors to the left lead us into a lofty, well-ventilated, well-lighted room, forming the main portion of the Museum. Every available space on the walls is covered with glass cases, and two rows of tables down the centre of the room are also covered in a similar manner. These cases are filled with specimens of different kinds of birds, reptiles, insects, shells, and the lesser animals, while specimens of the larger wild animals occupy vacant spaces on the floor. A spiral staircase leads to a gallery which runs round the whole of the inside of the building, and the walls here are also covered with well-filled cases, or with various curiosities from different parts of the world. The Curator is an affable, well-informed gentleman, and on several occasions has rendered me great service when I have visited the Museum for a special purpose. Few towns are so well provided as Burfleet in this respect, although the spread of education renders such places more useful and more necessary every year.

I am, my dear Sir,
Yours truly,
HUGH OWEN.

(3.)

North Bournemouth,
Co. Northumberland,
July 10th, 1881.

DEAR UNCLE,—Few parts of our country have witnessed more heroic deeds than those which have been enacted on the north-east coast; and even among these, noble as they are, few rank so high as one which I witnessed a short time ago in the county of Northumberland. The gales on this rock-bound coast have often proved fatal to many a gallant bark, and that of November 12th was no exception to the rule. Among other vessels in danger, an Italian sloop was driven ashore. The intensity of the gale and the loss of some of the ship's tackling had rendered her unmanageable, and, as the seamen were unacquainted with the use of the rocket apparatus, there seemed no possibility of saving the lives of those on board. At last a hardy miner, who had on previous occasions displayed remarkable courage in saving life, volunteered to carry the line to the vessel, which was now beating helplessly on the rocks. The people on shore looked upon the attempt as sheer madness, but the sight of a woman clinging to the mast and clutching to her breast a tiny child only increased his determination to try. Binding a stout rope round his waist, he assayed to reach the ship. Time after time he was beaten back, but ultimately succeeded in fastening the apparatus, by means of which the whole of the crew were saved. Every attention was paid to the rescued sailors and passengers, whose position seemed the more deplorable that they were unable to make themselves understood by those about them, while acclamations loud and long-continued greeted the brave-hearted miner for his deed of heroism. Some public recognition of his bravery is to be made, and no worthier recipient of a testimonial could be found.

Believe me yours truly,
HERON HAVELOCK.

(4.)

The Schoolhouse,
Hardcourt,
Near Broadfoot,
July 15th, 1881.

MY DEAR COUSIN,—My apprenticeship has terminated, and I have just been sitting at the Queen's Scholarship Examination. One of the questions rendered it necessary that I should consider what were the difficulties attending a young teacher's life; and as you think of 'joining the ranks,' I will tell you what I believe you may expect. You will find that the leisure you have so frequently had for light reading will be gone. Every day will show you the necessity for increasing your store of knowledge. The work of school will sometimes thoroughly weary you, and there will be great disinclination to hard study. One of your first and one of your most lasting difficulties, unless you are really bent upon being a workman who does not need to be ashamed, will be to overcome the tendency to desultory reading at home.

In school you will find difficulties on account of the different dispositions of your scholars, and when you imagine a certain method of procedure will effect the purpose you have in view you will in the end often be wofully disappointed. You will require to be constantly on the watch to avoid errors in this respect. Another difficulty will be to keep all your boys at work. Your energies may be bent upon one boy, and the class will become disorderly. A teacher has to learn (whatever the old proverb may say) to be able to do two or more things at the same time.

I have also found considerable difficulty in doing my work without causing worry to the master. I had to be unceasing in my efforts to avoid making too much noise, sending bad boys out for punishment as the easiest way of getting rid of them, or myself punishing them against the rules of the school.

These are some of the difficulties which have presented themselves to me, and I dare say you will not be exempt from them either. I have, however, overcome them. Teaching has numerous pleasures, and that they may far outnumber the difficulties you may meet with is the earnest wish of

Your affectionate Cousin,
CHARLES STEPHENS.

To TOM COURTNEY.

Grammar.

SECTION I.

Live—verb, reg. intrans., act., ind. pres., 3rd pl., agreeing with persons.
still—adv. of time, mod. 'live.'
can—verb, aux. to 'remember,' indg. pot. mood, pres.
remember—verb, reg. trans., inf. pres., gov. by 'can.'
can remember—verb, reg. trans., act., pot., pres., 3rd pl., ag. with its nom. 'who.'
how—cop. conj., joining 'who can remember' and 'field, etc., knew.'
bugle—noun, com., neut., sing., 3rd obj. gov. by 'blew.'
both—cop. conjunction, introducing the sent. 'Both field..... knew,' correlative with 'and.'
cliff—noun, com., neut., sing., nom. to 'knew.'
signal—noun, com., neut., sing., obj. gov. by 'knew.'
fast—adverb (manner), qual. 'drew.'
drew—verb, irreg. trans. (used intransly.), act., ind., past, 3rd sing., ag. with 'clan.'
what—relative pronoun used as adjective, qualifying 'time.'
was—verb, aux. to 'wound,' indicating pass. voice.
wound—past participle of 'to wind,' ref. to 'note.'
was wound—verb, irr. trans., pass., ind. past, 3rd sing., ag. with 'note.'
kindred—noun used as adj., qual. 'banner.'
like—adj. governing 'meteor.' *Like* might be considered = as: it would then be a conjunction, joining 'Fiery Cross glanced' and a 'meteor glances.'
round—adv. of place, qual. 'glanced.'

SECTION II.

Kind of Sentence.	Rel. to Principal Sent.	Subject.	Enlargement of Subject.	Predicate.	Extension of Pred.	Object.	Enlargement of Object.
Principal Sent.		[How] to deal	with him	was a puzzling question			
(*a*) Subordinate Sent.	Adverbial to *b*.	[While] lion and tiger	the	were tearing	off into the jungle with the prey	each other	
(*b*) Principal Sent.		jackal	the	had run			
(*a*) Subordinate Sent.	Adjective to *b*.	Who	his	spills	in the strife	life	the foremost foeman's
(*b*) Principal Sent.		party		conquers			
(*a*) Subordinate Sent.	Adverbial (condition) to *b*.	[If] I	my selfish	suffer	so	wrong	causeless
(*b*) Principal Sent.	Co-ordinate with *c*.	rage		is strong	so		
(*c*) Principal Sent.		sense	my of public weal	[is] low			
(*d*) Subordinate Sent.	Adverbial (manner, sequence) to *b* and *c*.	[that] I		should unkind		cords	those of love
(*e*) Subordinate Sent.	Adjective to *d*.	which		knit		country and kind	my

SECTION III.

Pronouns. *Personal:* him, his, I (2), my (4).
Relative: who, which.
Distributive: each other. Each and other are reciprocal pronouns.
Conjunctions. *Copulative:* how, and (2), if, tha', while.
Adverbs. *Degree:* so (2).
Place: off.

SECTION IV.

1. Receiving.—Words containing the improper diphthongs *ei* and *ie*. *Rule.*—After *c* write *e*; after any other consonant write *i*. Exceptions: Seize, weird, either, neither, and words containing -feit.

Judgment, Changeable.—These words are among the *exceptions* to the following rules:—

(*a*) When a word ends with silent *e*, the *e* is retained before an affix beginning with a consonant.

(*b*) When a word ends with silent *e*, the *e* is dropped before an affix beginning with a vowel.

Other exceptions:—

To (*a*)—due, true, whole, awe, lodge, abridge, argue, acknowledge, wide, wise.

To (*b*)—The *e* is retained before affixes *able* and *ous*, and some words in *ing*, when the *e* is preceded by *c* or *g*.

2. The literal meaning of *reflexive* is *turned backward*. It is used to describe pronouns (myself, thyself, etc.) when, along with the verb, they show that the action comes back upon the doer—the doer of the action, and the person acted upon being the same. Reflexive pronouns are formed by the addition of the noun *self* to the possessive or objective case of the personal pronouns.

When a word is not used in a limited, precise, or certain sense, it is said to be *indefinite*. The word *one* is used indefinitely in grammar for *any* person, and is called an *indefinite pro-*

noun. So are *any*, *some*, and *other*. When these words are used as adjectives, they are also called *indefinite adjectives*.

3. The subjunctive mood includes those forms of the verb by means of which an event is spoken of as a supposition, or as conditional upon some other action or event.

It is generally preceded by one of the conjunctions *if*, *that*, *though*, *unless*, *except*, etc. The indicative mood, however, follows these conjunctions quite as often as the subjunctive.

The *subjunctive* is used—

(*a*) When a supposition is made which is contrary to a known fact, as: 'If he were present (which he is not), I would speak to him.'

(*b*) When a clause expresses a wish contrary to the fact, as: 'I wish that he were away (which he is not).'

(*c*) When a supposition is made with regard to the future: 'If they do come, we shall be ready.'

(*d*) Without a conjunction, as: 'Had I expected this, I would have acted differently.'

SECTION V.

1. *Next*; used as *adjective*:—He came the next day.
as *preposition*:—She followed next the bride.
as *adverb*:—Who will go next?

Under; used as *preposition*:—He fell under the wheels of the cart.
as *adverb*:—The boat went under.

Till; used as *preposition*:—He stayed till the break of day.
as *conjunction*:—The siege was continued till the enemy capitulated.

By; used as *adverb*:—Stand by.
as *preposition*:—He walked by the river.

That; used as *distinguishing adjectiv.*:—That man has been here all day.
as *conjunction*:—He said that he would succeed.
as *relative pronoun*:—He is the very man that I want.
as *compound relative*:—We speak that we do know.

Like; used as *adjective*:—He shall so come in like manner.
as *verb*:—The boys like play.
as *noun*:—We ne'er shall look upon his like again.
as *adverb*:—He spoke in a like manly way.

2. *Compact*—from *com*, with, and *pango*, I fasten.
arrange—from *ad*, to, and *ranger* (F.), a rank or row.
acquaint—from *ac*, to, and *cognitus*, known.
algebra—from Arabic, *al-gabr*.
geography—from *ge*, the earth, and *grapho*, I write.
dissuade—from *dis*, against, and *suadeo*, I advise.
abroad—from Anglo-Saxon *a*, and *brad*.
precede—from *pre*, before, and *cedo*, I go.
suspend—from *sub*, under, and *pendo*, I hang.

3.

		Noun.	*Adjective.*	*Verb.*
disco	...	disciple	disciplinary	discipline
sedeo	...	sediment	sedate	preside
scribo	...	scribe	scribbling	ascribe
verto	...	version	versatile	divert
duco	...	duke	ducal	educate
dico	...	diction	dictatory	dictate

SECTION VI.

1. (*a*) Incorrect. *Rule.*—Two or more singular nominatives joined by *or* or *nor* require the verb to be in the singular. Neither she nor James was there.

(*b*) Incorrect. *Rule.*—A pronoun must agree with the noun for which it stands, in gender, number, and person. Either Mary or Jane must fetch me her rake.

(*c*) Incorrect. *Rule.*—The verb agrees with its nominative in number and person. 'Tales of a Grandfather' is the plural title of a *single* work, and therefore requires the verb to be in the singular.

2. Metaphor is a transferring to one object the sense of another, as—

The name of the Lord is a strong tower.
Brevity is the soul of wit.

Simile is a figure by which we express a comparison founded on resemblance. It is generally introduced by the words *like* or *as*.

Ex.—Charity, like the sun, brightens every object on which it shines.

3. The English defective verbs in common use are *shall*, *will*, *may*, *must*, *can*, *ought*.

The following verbs are obsolete, or nearly so. *To wit:—quoth*, *thinks* (= seems), *worth* (*is* or *be*), *durst*, *wont* (now only used as participle), *yclept*. As these verbs make no complete sense by themselves, with the exception of ought, they are used as auxiliaries to other verbs. Each of them is used with the infinitive without the sign *to*.

Languages.

MALE AND FEMALE CANDIDATES.

Three hours allowed for this Paper.

This paper is voluntary.
Candidates examined in England, and *Female* Candidates in Scotland, may answer questions in *one* Language (*only*).
Male Candidates in *Scotland* may answer questions in *two* (not more) Languages.

Latin.

1. Translate into English:—

Hi neque vultum fingere neque interdum lacrimas tenere poterant: abditi in tabernaculis aut suum fatum querebantur, aut cum familiaribus suis commune periculum miserabantur. Vulgò totis castris testamenta obsignabantur. Horum vocibus ac timore paulatim etiam ii qui magnum in castris usum habebant, milites centurionesque, quique equitatui praeerant, perturbabantur. Qui se ex his minùs timidos existimari volebant, non se hostem vereri, sed angustias itineris et magnitudinem silvarum, quae inter eos atque Ariovistum intercederent, aut rem frumentariam, ut satis commodè supportari posset, timere dicebant. Nonnulli etiam Caesari renuntiabant, quum castra moveri ac signa ferri jussisset, non fore dicto audientes milites, neque propter timorem signa laturos.

2. Parse fully the words querebantur, castris, equitatui, timidos, intercederent, fore, jussisset, laturos.

3. (*a*) Decline in both numbers, ille ferox miles and leo iste fulvus.

(*b*) Give the dative singular and plural of flos, filia, arbiter, eques, dux, senectus. domus, dies, portus, genu, and filius.

(*c*) Give the perfect of scribo, cano, adsum, facio, possum, sono, vivo, soleo, rapio, capio, peto, cedo, lego, and conjugate, in the passive form, facio, interficio, and satisfacio.

4. Explain the subjunctives in the passage given above.

5. Translate into Latin:—

(*a*) There were some, who could not restrain their tears.
(*b*) He is not the man to complain of his fate.
(*c*) No brave man fears the enemy.
(*d*) I cannot deny that he is a brave man.
(*e*) No one is allowed to break the laws.
(*f*) Who taught you music and grammar?
(*g*) We have need of peace.

6. Translate into Latin:—

When the news had been brought to Caesar that they are endeavouring to make their way through our province, he set out from the camp. When the Helvetii were informed of his approach, they send ambassadors to him, to say that they propose to march through the province, as they have no other way.

Greek.

1. Translate into English:—

Ἐγὼ μὲν γὰρ ὀκνοίην ἂν εἰς τὰ πλοῖα ἐμβαίνειν ἃ ἡμῖν δοίη, μὴ ἡμᾶς αὐταῖς ταῖς τριήρεσι καταδύσῃ· φοβοίμην δ' ἂν τῷ ἡγεμόνι ᾧ δοίη ἕπεσθαι, μὴ ἡμᾶς ἀγάγῃ ὅθεν οὐχ οἷόν τε ἔσται ἐξελθεῖν· βουλοίμην δ' ἄν, ὅκοτε ἀπιὼν Κύρου, λαθεῖν αὐτὸν ἀπελθών· ὃ οὐ δυνατόν ἐστιν. Ἀλλ' ἔγωγε φημὶ ταῦτα μὲν φλυαρίας εἶναι· δοκεῖ δέ μοι ἄνδρας ἐλθόντας πρὸς Κῦρον, οἵτινες ἐπιτήδειοι, σὺν Κλεάρχῳ ἐρωτᾶν ἐκεῖνον τί βούλεται ἡμῖν χρῆσθαι· καὶ ἐὰν μὲν ἡ πρᾶξις ᾖ παραπλησία οἵαπερ καὶ πρόσθεν ἐχρῆτο τοῖς ξένοις, ἕπεσθαι καὶ ἡμᾶς καὶ μὴ κακίονι εἶναι τῶν πρόσθεν τούτῳ συναραβάντων·

2. Parse fully δοίη, καταδύσῃ, ᾧ, ἀγάγῃ, ἄκοντος, φλυαρίας, ἡμῖν, κακίονς, ἐχρῆτο, συναναβάντων.

3. (*a*) Decline in both numbers αὕτη ἡ χώρα, and οὗτος, αὕτη, τοῦτο.

(*b*) Give the genitive singular of χώρα, στρατιώτης, πέδιον, ἄνερ, μισθοδότης, πατήρ, δύναμις, χειρ, πάθος, and the genitive dual and plural, respectively, of ἐπιστολή, ἄγγελος, and βασιλεύς.

(*c*) Give the aorists of ἐλαύνω, πέμπω, μένω, φεύγω, ἔχω, σπανίω, ἔρχομαι, τέμνω, τίθημι, ἵημι and δίδωμι.

4. State what you know of the rules for the comparison of adverbs, and compare σοφῶς; αἰσχρῶς, ἄνω, κάτω, εὖ, ἐγγύς, μάλα, πολύ and πρωΐ.

5. Translate into Greek:—

(*a*) Cyrus collected an army and besieged the city.
(*b*) Cyrus stayed there five days.
(*c*) Be not astonished that I am sorely troubled at the present state of things.
(*d*) It seems to me that it is not the time for us to sleep.
(*e*) They said they would not go.
(*f*) Be well assured that I would choose freedom.
(*g*) Do you think that the king will fight with you?

ANSWERS—LANGUAGES.

Latin.

1. Now and then these men were unable either to control their countenance or restrain their tears. They bewailed their fate in the seclusion of their tents, or deprecated the common danger in the company of their comrades. Wills were being signed everywhere all over the camp. Gradually even those who had had great experience in military service, the soldiers, and centurions who were at the head of the cavalry, were disturbed by the talk and the terror of these men. Those of these who wished to be considered less timid, kept asserting that it was not the enemy they feared, but the difficulties of the journey and the size of the woods which lay between them and Ariovistus, or that the commissariat could scarcely be conveniently maintained. Some even announced to Caesar, when he had ordered the camp to be struck and the standards to be raised, that through their dread the soldiers would be disobedient to his command and would refuse to do so.

(It will be noted that we have not translated '*timere*.' Caesar uses this word because *vereri* cannot be applied to things. The difference is untranslatable.)

2. *Querebantur*—deponent verb., indicative, imperf., 3rd plu. *queror, questus sum, queri.*
castris—noun, 2nd declension, neuter, abl. plural.
castrum means a 'fort.'
castra ,, 'camp.'
equitatui—noun, 4th declension, masculine, dative singular from *equitatus.*
timidos—adj. masc. acc. plural, from *timidus—a—um.*
intercederent—verb, 3rd conj., imperf. subj., 3rd plural, from *intercedo, intercessi, intercessum.*
fore—verb, future infin., *sum, fui, esse.*
jussisset—verb, 2nd conj. act., plu. perf. subj., 3rd plural *—jubeo, jussi, jussum.*
latures—verb, future, participle, act., accusative masc., plural—*fero, tuli, latum, ferre.*

3.

	Singular.	Plural.
(*a*) *N.*	ille ferox miles	illi feroces milites
G.	illius ferocis militis	illorum ferocium militum
D.	illi feroci militi	illis ferocibus militibus
Ac.	illum ferocem militem	illos feroces milites
Ab.	illo feroce milite	illis ferocibus militibus
N.	leo iste fulvus	leones isti fulvi
G.	leonis istius fulvi	leonum istorum fulvorum
D.	leoni isti fulvo	leonibus istis fulvis
Ac.	leonem istum fulvum	leones istos fulvos
Ab.	leone isto fulvo	leonibus istis fulvis

(*b*) Dat. sing.	flori	plur.	floribus
	filiae		filiabus
	arbitro		arbitris
	equiti		equitibus
	duci		ducibus
	senectuti		senectutibus
	domui (locative domi)		domibus
	diei		diebus
	portui		portubus
	genui		genubus / genibus
	filio		filiis

(*c*)

scribo	perf.	scripsi
cano	,,	cecini
adsum	,,	adfui
facio	,,	feci
possum	,,	potui
sono	,,	sonui
vivo	,,	vixi
soleo	,,	solitus sum
rapio	,,	rapui
capio	,,	cepi
peto	,,	petii
cedo	,,	cessi
lego	,,	legi

(The latter part of the present question may be found in any Latin grammar. So far as we see, 'conjugate' means give all the tenses in full.)

4. The first subjunctive is intercederent. This is naturally subjunctive as occurring in a sentence dependent upon a sentence which is itself in oratio obliqua. Here of course the writer has no motive, such as a wish to emphasise the *fact* that there were angustiae itinerum, sufficient to induce him to use the indicative.

posset is subjunctive after ut with a verb of fearing, corresponding to our *lest . . . . not.*
jussisset. The usual construction with *quum* in oblique narration of past time is the plu. perf. subj.

5. (*a*) Erant qui lacrimas tenere non possent.
(*b*) Non is est qui fata miseretur.
(*c*) Nemo fortis hostem veretur.
(*d*) Negare non possum quin fortis sit.
(*e*) Nemini licet leges violare.
(*f*) Quis te musicam atque grammaticam docuit?
(*g*) Opus est nobis pacis.

6. Quum Caesar certior factus esset eos ut iter per provinciam facerent eniti, e castris profectus est. Helvetii adventu nuntiato legatos ad eum mittunt qui dicerent se per provinciam quum via nulla alia pateret, ituros esse.

Greek.

1. For I on the one hand should shrink from embarking in the boats which he would provide for us lest he should sink us, triremes and all. On the other hand I should fear to follow the leader he would give us lest he should lead us to a place whence we could not return. And if I were to go away without the consent of Cyrus, I should wish to escape his notice in so doing. This is impossible. But at least say that such talk is nonsense. My opinion is that men, whosoever are fit, should go to Cyrus along with Klearchus and ask him for what purpose he intends to use us. If the business should resemble that for which he formerly used the allied troops, we also should follow and not be more cowardly than those who previously went up with him.

2. δοίη—Third person singular, strong aorist optative, active of δίδωμι, δώσω, ἔδωκα.
καταδύσῃ—Third person singular, weak aorist, subjunctive active of *καταδύω—δύσω, κατέδυσα.*
ᾧ—Dative singular masculine of ὅς, ἥ, ὅ. In this case it is dative through *attraction* instead of the more natural accusative ὅν.
ἀγάγῃ—Third person singular, strong aorist subjunctive, active of ἄγω, ἄξω, ἀγήοχα or ἦχα, ἤγαγον.
ἄκοντος—Genitive masculine singular of ἄκων, ἄκουσα, ἄκον.
φλυαρίας—I. Declension. Accusative plural of φλυαρία, φλυαρίας.
ἡμῖν—Dative of ἡμεῖς, which is used as the plural of ἐγώ.
κακίονς—Accusative plural masculine of *κακίων*, the comparative of κάκος.
ἐχρῆτο—Third person singular, imperfect indicative of χράομαι.
συναναβάντων—Genitive plural masculine of the strong aorist participle active of *συναναβαίνω, βήσομαι, βέβηκα, συνέβην.*

3. (*a*)

		Sing.	
N.	αὕτη	ἡ	χώρᾱ
G.	ταύτης	τῆς	χώρας
D.	ταύτῃ	τῇ	χώρᾳ
A.	ταύτην	τὴν	χώρᾱν
		Dual.	
N.A.	τάντα	τὰ or τῶ	χωρᾶ
G.D.	τάνταιν	τᾶν	χωρᾶν

Plur.

N.	αὗται	αἱ	χώραι
G.	ταύτων	τῶν	χωρῶν
D.	ταύταις	ταῖς	χωραῖς
A.	ταύτας	τάς	χώρας

	Masc.	Fem.	Neut.
N.	οὗτος	αὕτη	τοῦτο
G.	τούτου	ταύτης	τούτου
D.	τούτῳ	ταύτῃ	τούτῳ
A.	τοῦτον	ταύτην	τοῦτο
N.A.	τούτω { τούτω or ταύτα		τούτω
G.D.	τούτοιν	ταύταιν	τούτοιν
N.	οὗτοι	αὗται	ταῦτα
G.	τούτων	τούτων	τούτων
D.	τούτοις	ταύταις	τούτοις
A.	τούτους	ταύτας	ταῦτα

(*b*) Gen. sing. of

χώρα	χωρας
στρατιώτης	στρατιωτου
πεδίον	πεδίου
ἀνηρ	ἀνδρος
μισθοδότης	μισθοδότου
πατήρ	πατρός
δύναμις	δυνάμεως
χείρ	χειρὸς
πάθος	παθοῦς

4. Gen. dual and plur. of ἐπιστολή, ἐπιστολαω, ἐπιστολῶν
ἄγγελος, ἀγγέλοιν, ἀγγέλων
βασιλεύς, βασιλέοιν, βασιλέων

(*c*)

ἁλαόω	ἥλασα
πέμπω	ἔπεμψα
μένω	ἔμεινα
φεύγω	ἔφυγον
ἔχω	ἔσχων
ἐταινόω	ἐτήνεσα
ἔρχομαι	ἦλθον
τέμνω	ἔταμον } ἔτεμον }
τίθημι	ἔθηκα
ἵημι	ἧκα
δίδωμι	ἔδωκα

4. We have two chief cases :—

I. When the comparative and superlative are adjectives, as

πρὸ	πρότερος	πρῶτος
ὑπο	ὕστερος	ὕστατος

II. When the comparative and superlative are adverbs. These are again subdivided :—

A. Following analogy of their adjectives—for the comparative take the neuter singular of the adjectival comparative ; for the superlative, the neuter plural of the adjectival superlative.

σόφως	σοφώτερον	σοφωτάτον
αἰσχρως	αἰσχιον	αἴσχιστα
μαλὰ	μαλλὸν	μάλιστα
πολὺ	πλείον } πλέον }	πλεῖστα
πρόΐ	πρωιτέρον	

B. Adverbs with comparative in—σερω by the side of one in—τερον, or in—ωτερω by the side of—ον. The superlative in—ταται not used.

σαφῶς	{ σαφεστέρως σαφεστέρον	σαφεστάτα
εὖ	ἀμεινον	ἄριστα
	{ κρεισσονῶς κρεισσὸν	κρατιστὰ
	βελτίον	βέλτιστα

C. Comparative and superlative in—τερω—ταται.

ἄνω	ἀνωτέρω	ἀνωτάτω
κατω	κατωτέρω	κατωτάτω
ἐγγυς	{ ἐγγυτέρω ἐγγυτέρον { ἐγγύτερον	ἐγγυτάτω ἐγγυτάτα ἐγγύτατα

5. (*a*) ὁ δὲ Κύρος στρατευμὰ ἄθροισας τῆν πόλιν ἐπολιορκήσεν.
(*b*) ὁ δὲ Κύρος ἄντου ἔμεινε πέντε ἡμερας.
(*c*) μῆ θαυμασῆτ εἰ δυτ φέρομι τὰ παρόντα.
(*d*) ἔμοι δοκεῖ οὐ τούτον τὸν κάιρον ἡμῖν κάθευδειν.
(*e*) οὐκ ἔφασαν μέλλειν ἀπιεναι.
(*f*) εὖ ἴσθι ἐμε ὼτ τῆν ἐλευθερίαν αἱρησομένον.
(*g*) ἆρα δοκεῖ ὅτι ὁ βάσιλευτ πρὸτ ὕμας μαχέσεται ;

[In consequence of the pressure upon our space, we are compelled to hold over the remainder of these Questions till next month.]

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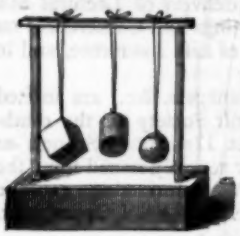

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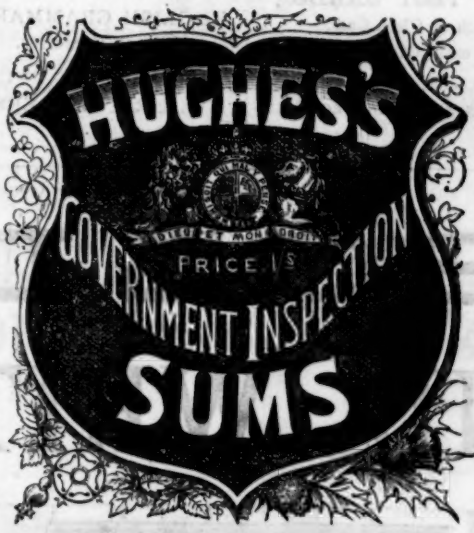

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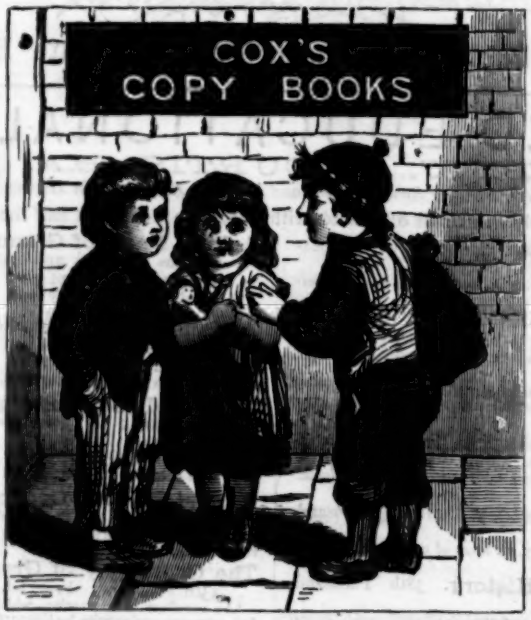

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